

EXHIBIT 51

M16 rifle

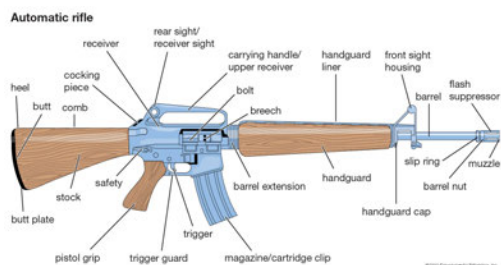


M16 assault rifle

M16A1 assault rifle. Colt's Manufacturing Company has produced various M16 models for the U.S. military since the 1960s.

M16 rifle, assault rifle developed as the AR-15 by American engineer Eugene Stoner of ArmaLite Inc. in the late 1950s. The rifle received high marks for its light weight, its accuracy, and the volume of fire that it could provide.

The AR-15 was developed as a more portable alternative to the 7.62-mm (.308-calibre) battlefield rifles of the day, but ArmaLite had limited success in marketing it to the U.S. military. The AR-15 design was licensed to Colt's Patent Firearms Manufacturing Company (later Colt's Manufacturing LLC) in 1959, and upon its adoption by the U.S. Air Force in 1962, the AR-15 was designated the M16 by the Department of Defense. Modified versions of the AR-15 (designated the XM16E1) were used by American combat troops in the Vietnam War in the mid-1960s. Despite its advantages, it was prone to jamming because of a convergence of factors. Improved training, wider distribution of cleaning kits, and a change in the composition of the powder used in the rifle's ammunition dramatically reduced the rate of malfunction. With some minor adjustments based on recommendations from the field, the rifle, now designated the M16A1, was adopted as the standard infantry weapon for the U.S. military in 1967, superseding the M14 rifle. Colt subsequently marketed a semiautomatic version of the rifle to civilians and law-enforcement personnel as the AR-15, and upon the expiration of various patents in the 1970s, other companies followed suit. That resulted in the application of the term AR-15 both to a specific type of semiautomatic rifle and to the broader family of selective-fire rifles based on the original ArmaLite platform.



M16 assault rifle

Functional components of an automatic rifle, as illustrated by the

The M16 is gas-operated and, in its original configuration, had both semiautomatic (i.e., autoloading) and fully automatic fire-control options. The M16A2, adopted by the U.S. military in the early 1980s, replaced fully automatic fire with a three-round-burst capability that was intended to increase accuracy and reduce ammunition consumption. The use of aluminum and

M16 assault rifle.

composite materials rather than wood made the various iterations of the M16 significantly lighter than the M14 or the AK-47. The M16A4—the standard infantry weapon of the U.S. Marine Corps since 2003—weighs less than 3.3 kg (just over 7 pounds) unloaded. It measures 100 cm (39 inches) long, has a 20-round or 30-round magazine, and fires 5.56-mm (.223-calibre) ammunition at a rate of 700–950 rounds per minute. Optional enhancements to the M16 family include the M203 grenade launcher, a bayonet, and an assortment of rail-mounted flashlights, scopes, and laser-targeting systems. Although the M16 remained the weapon of choice for military forces around the world into the 21st century, by 2010 the U.S. Army had largely transitioned to the M4, a carbine based on the AR-15 platform, as its primary infantry weapon.

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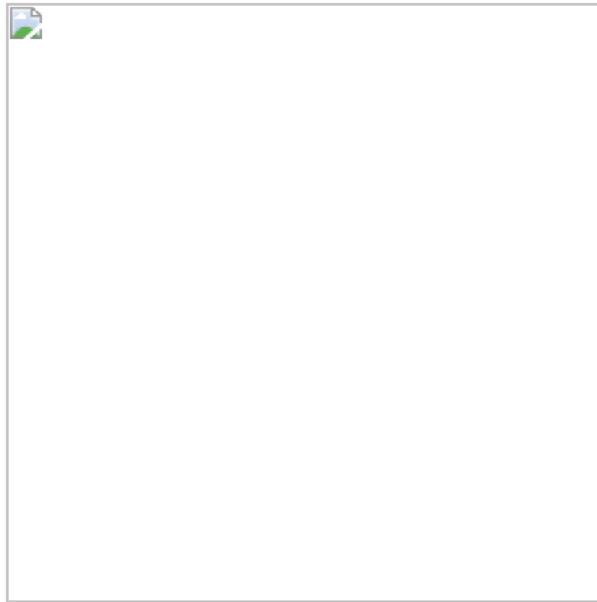
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EXHIBIT 52

The Truth About So-Called “Assault Weapons”

nraila.org/the-truth-about-so-called-assault-weapons



Gun control advocates bring up “assault weapons” time and time again. It seems almost impossible to have a discussion about Second Amendment rights without hearing the term. And yet, what many Americans who aren’t familiar with guns don’t know is — **it’s not even a real term.**

How the Term “Assault Weapon” Came to Be

Gun control advocates adopted the term “assault weapon” from the military in an effort to deliberately confuse the public and advance the political cause of gun control. They now use it to mischaracterize a broad range of firearms used by law-abiding civilians.

The origin of “assault weapon” stems from the term “assault rifle,” which the U.S. Army defines explicitly as a selective-fire rifle chambered for a cartridge of intermediate power. **The term “assault rifle” only applies to automatic firearms** rather than the semi-automatic firearms that gun control advocates are focused on banning today.

The key difference is that semi-automatic firearms, such as AR-15s, only **fire a single round** each time the trigger is pulled. Automatic firearms — including military assault rifles — **discharge continually** when the trigger is pulled. Although they are often used in the Armed Services, these firearms are not readily available for sale to the general public. To purchase a fully-automatic firearm requires an extensive FBI background check including fingerprints and photographs, as well as registration of the firearm at the federal level.

However, gun control advocates refer to semi-automatic and fully automatic firearms **interchangeably** — in a deliberate effort to confuse voters and advance their broad agenda.

In 1984, a group called Handgun Control, Inc. first used the term “assault weapon” in reference to a rifle in a newspaper advertisement.

A few years later, in 1988, the term rose in prominence after Josh Sugarmann, a gun control advocacy group’s communications director, stated in a Violence Policy Center paper [1]:

“The weapons’ menacing looks, coupled with the public’s confusion over fully automatic machine guns versus semi-automatic assault weapons - anything that looks like a machine gun is assumed to be a machine gun - can only increase the chance of public support for restrictions on these weapons.”

This statement by a prominent gun control lobbyist outlined their intentions clearly. The goal behind popularizing the term “assault weapons” was always to deliberately mislead the American people in order to pass anti-gun legislation.

The use of the term “assault weapons” exploded in the years to follow, eventually catching on in the mainstream media, who used the adopted phrase to cause further confusion.

It helped gun control advocates garner support to pass the 1994 federal “assault weapons” ban — and the plan succeeded. The ban lasted for ten years until it expired in 2004 after Congress determined the ban had no impact on reducing crimes committed with guns.

Since then, gun control advocates have continued to push for additional bans. However, they now struggle to agree on a definition for their made-up phrase.

Gun Control Advocates Can’t Define “Assault Weapon”

Gun control advocates’ definition of “assault weapon” varies depending on the source **because they cannot collectively agree on how to define it.**

This even applies to politicians who could have potentially banned our firearms. Just look at David Chipman, for example.

Joe Biden nominated Chipman to run the Bureau of Alcohol, Tobacco, Firearms and Explosives (ATF), the government agency in charge of enforcing gun laws. Chipman couldn’t even nail down a definition during a May 2021 Senate Judiciary Committee hearing.

During the hearing, Senator Tom Cotton asked the simple question, “What is an ‘assault weapon’?”

Chipman tried to avoid a response before hesitantly stating [2]:

“Any semi-automatic rifle capable of accepting a detachable magazine above the caliber of .22, which would include a .223, which is, you know largely the AR-15 round.”

Cotton pointed out that would “basically cover every single modern sporting rifle in America today.” It would also include a number of collectible rifles.

Chipman is just one example of how **gun control advocates struggle or even refuse to define the firearms that they are seeking to ban.**

And rifles aren’t the only firearms they’ve tried to put under the umbrella of “assault weapons.”

Gun control advocates have also targeted handguns, such as pistols that hold ten rounds. Biden himself said he would push to ban 9-millimeter pistols. He stated:

“I’m the only guy that ever got passed legislation, when I was a senator, to make sure we eliminated assault weapons. The idea you need a weapon that can have the ability to fire 20, 30, 40, 50, 120 shots from that weapon, whether — whether it’s a 9-millimeter pistol or whether it’s a rifle, is ridiculous. I’m continuing to push to eliminate the sale of those things.”

Again, gun control advocates are willing to refer to any firearm as an “assault weapon” if it suits their needs. But there is rarely any consistency in which firearms they decide to include.

This 1994 “assault weapons” and “large capacity magazine” ban named prohibited guns specifically but then tried to more broadly define the term to include several cosmetic features such as pistol grips and folding stocks. [3] These cosmetic features had little or nothing to do with whether certain firearms were more likely to be used in a crime.

In short, gun control advocates will use any definition of “assault weapons” that suits their political motivations, and they’ve shown that over time.

Why Should “Assault Weapons” Not be Banned

The 1994 federal “assault weapons” ban shows us why a similar ban wouldn’t work today. Simply put, **it had no impact in curbing violent crime.**

A 1997 congressionally-mandated study looked at the effects of the first 30 months of the 1994-2004 federal “assault weapons” ban and found it had no impact on crime. [4] And a follow-up study found that “the ban’s effects on gun violence are likely to be small at best and perhaps too small for reliable measurement.” [5]

Later research conducted in 2018 also found no evidence that “large capacity magazine” bans and “assault weapon” bans affect mass shootings. [6]

Studies and research are helpful indicators as to why another federal “assault weapons” ban wouldn’t work, but **let’s also consider some commonsense points:**

- Rifles overall are responsible for a very small fraction of violent crime. More people are killed with fists and knives than with rifles every year. [7]
- Semi-automatic rifles like AR-15s are some of the most popular firearms used in home defense and in marksmanship competitions.
- Law-abiding Americans own an estimated 11 million AR-15s — yet violent crime has not taken over the country as gun control advocates suggested. In fact, it’s gone down.

“Assault Weapons” Moving Forward

Gun control advocates will undoubtedly continue to push the narrative that semi-automatic firearms are dangerous “assault weapons.” Biden even campaigned on the promise to reenact a federal ban, once again relying on scare tactics to gain support.

But there are steps you can take to help combat misinformation and preserve our Second Amendment rights. You’re already off to a good start by reading this article.

Educate yourself. Don’t rely on the words of politicians. Instead, research firearms and form your own opinions about semi-automatic rifles. Some helpful links are listed in the section below. Be sure to encourage those around you to do their own research as well.

Get active. Reach out to your local government leaders and voice your opinion. Help NRA-ILA fight to protect your rights by making a contribution. Or join millions of other freedom-loving Americans and become a member of the NRA.

When it comes to American freedom and the safety of our citizens, so-called “assault weapons” pose far less threat than those who spread falsehoods in order to advance their own assault on our freedom.

Additional Resources

[Facts About “Assault Weapons” and “Large Magazines”](#)

[Learn More About Gun Laws in Your State](#)

[Stay Up to Date with Gun Legislation](#)

[Subscribe to Voice of Freedom – Your Source For Second Amendment News](#)

Notes

[1] Sugarmann, Josh. [Assault Weapons and Accessories in America](#). Violence Policy Center, July 13, 2015.

[2] Chamberlain, Samuel, Biden ATF Pick David Chipman Botches Assault Rifle Definition At Contentious Hearing, New York Post, May 27, 2021.

[3] 103rd United States Congress. Public Safety and Recreational Firearms Use Protection Act. H.R. 4296, 1994.

[4] Roth, Koper, et al., Impact Evaluation of the Public Safety and Recreational Firearms Use Protection Act of 1994, Urban Institute, March 13, 1997.

[5] Koper, Christopher S., An Updated Assessment of the Federal Assault Weapons Ban: Impacts on Gun Markets and Gun Violence, 1994-2003, Report to the National Institute of Justice, June 2004.

[6] Rand Corporation, The Science of Gun Policy: A Critical Synthesis of Research Evidence on the Effects of Gun Policies in the United States, p. 66, 2018.

[7] FBI, Expanded Homicide Data Table 4: Murder Victims by Weapon, 2012–2016. Crime in the United States 2016. May 8, 2017.

EXHIBIT 53

News Releases

 web.archive.org/web/20100425014123/https://www.nssf.org/NewsRoom/releases/show.cfm

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Modern Sporting Rifle Owners Are Most Active Shooters, Says NSSF/Responsive Management Survey

Overall Target Shooting Participation Reaches New High -- 34.4 Million

NEWTOWN, Conn. -- The first comprehensive survey to look at ownership and use of modern sporting rifles reveals that 8.9 million Americans went target shooting with AR-style rifles in 2009 and that participants using this type of rifle were the most active among all types of sport shooters.

"These findings underscore that modern sporting rifles are becoming commonplace in America and are among the most desired firearms by sport shooters," said Steve Sanetti, president of the National Shooting Sports Foundation, trade association of the firearms industry. "Those who want to ban these civilian sporting rifles simply because they look like military rifles must acknowledge after seeing this study that AR-style rifles are exceedingly popular with



millions of Americans. These rifles are our industry's high-tech, cutting-edge product -- rugged, accurate, versatile, fun to shoot and easily accessorized -- and they're here to stay."

The study, "Shooting Sports Participation Survey in the United States in 2009," was conducted for NSSF by Responsive Management through a random digit dialing telephone survey of 8,204 U.S. residents ages 18 and older. (This is a separate survey from the NSSF/Harris Interactive online poll announced in a March 31 press release.) To avoid confusion, the term "modern sporting rifle" was further defined as an AR-style rifle.

Mark Damian Duda, executive director of Responsive Management, explained the survey's methodology, saying "This was a highly scientific study with the sample meticulously developed on a state-by-state basis to construct the national number. Both landline and cell phones were utilized in the actual proportions they exist within the American population."

Duda said this type of telephone survey yields a 95 percent confidence level. The report's sampling error is plus or minus 1.08 percentage points.

New High for Overall Participation -- 34.4 Million Shooters

The statistics related to modern sporting rifles were part of a wide-ranging survey that revealed a new high-water mark for annual participation in formal and informal sport and target shooting. The study showed that 15 percent of the U.S. population, representing 34.4 million people nationwide, went target shooting in 2009. This number surpasses all other previous survey estimates of annual sport shooting participation.

"Recreational shooting had a banner year in 2009," said Sanetti. "Firearms sales were way up, so it's really no surprise that more people are enjoying the shooting sports than ever before."

Added Duda, "This study measured all shooting participation—from hunters sighting in, to friends going shooting with friends who own firearms, to women practicing their self-defense skills. This study measured the full range of shooting activities across America."

Modern Sporting Rifle Shooters Most Active

Compared with sport shooters using other types of firearms, users of modern sporting rifles were most active nationally -- and also in every U.S. region identified in the study.

The survey showed that an estimated 8,868,085 people shot a modern sporting rifle in 2009, doing so on 22.9 days. Regionally, those who lived in the South participated on 29.6 days, followed by the West (21.1 days), Northeast (20 days) and Midwest (15.5 days). Though more people shot other types of rifles (24 million) and handguns (22 million) than modern sporting rifles, they ranked below modern sporting rifle shooters in activity, with rifle users participating on 17.3 days and handgun shooters 16.7 days.

More people shot with modern sporting rifles, and more often, than with shotguns in the established sports of skeet, trap and sporting clays. The survey showed 7.6 million people went trap shooting on 14.8 days, 7 million went skeet shooting on 15.5 days and 8.4 million participated in sporting clays on 13.7 days.

The survey sought to define the demographic makeup of those who shoot with a modern sporting rifle, such as an AR-15, but *not* a traditional sporting rifle, such as a bolt or lever action, revealing the following:

- Most modern sporting rifle users reside in small cities or towns (25 percent) and non-farm rural areas (25 percent) compared with urban areas (19 percent), suburban areas (16 percent) and farms/ranches (15 percent).
- Modern sporting rifles appealed to younger shooters, with 64 percent of users ranging in age from 18 to 44.
- Modern sporting rifle users were 86 percent white, with Hispanic/Latinos the next largest ethnic group at 5 percent.
- Men represented 84 percent of modern sporting rifle shooters and women 16 percent.
- 34 percent of modern sporting rifle shooters had some college education or a trade school degree, 29 percent a bachelor's degree and 27 percent a high school degree or equivalent.

"We hope this survey helps shed light on the often misunderstood modern sporting rifle and demonstrates the tremendous appeal they have with recreational shooters," said Jim Curcuruto, NSSF's director of industry research and analysis. "This survey provides a baseline to measure what will undoubtedly be an increase in participation with these rifles in the future. NSSF will continue to research this exciting segment of the firearms industry in an effort to develop a more in-depth understanding and identify trends for NSSF member companies to utilize."

Ownership of modern sporting rifles has been a contentious issue in the United States. In 2004 Congress did not renew a federal law that prohibited the sale of semi-automatic rifles with certain cosmetic features such as the pistol grip and adjustable stock found on many models of modern sporting rifle. Various studies found insufficient evidence that the law had any effect on reducing violent crime.

Modern sporting rifles, built on the AR-15 platform, are often confused with military rifles such as the M-16 and M-4. While modern sporting rifles and military rifles look similar to each other, the modern sporting rifle functions as a semi-automatic, firing one round with each pull of the trigger. Anti-gun organizations that support banning these civilian sporting rifles deliberately mislabel them as "assault rifles" even though an actual assault rifle is fully automatic -- a light machine gun. Automatic firearms have been severely

restricted from civilian ownership since 1934. The AR designation does not stand for "assault rifle" or "automatic rifle," but rather for ArmaLite, the company that developed the rifle in the 1950s.

The National Shooting Sports Foundation last year launched a campaign - "Evolution of the American Hunting Rifle" -- to correct confusion and misinformation about semi-automatic modern sporting rifles among hunters. The latest component of the campaign -- an educational message aimed at recreational shooters -- will appear in recreational shooting magazines this year. Learn more at www.nssf.org/msr.

To view the full NSSF/Responsive Management "Shooting Sports Participation Survey in the United States in 2009," go to www.nssf.org.

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About NSSF

The National Shooting Sports Foundation is the trade association for the firearms industry. Its mission is to promote, protect and preserve hunting and the shooting sports. Formed in 1961, NSSF has a membership of more than 5,500 manufacturers, distributors, firearms retailers, shooting ranges, sportsmen's organizations and publishers. For more information, log on to www.nssf.org.

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EXHIBIT 54

Large-Capacity Magazines and the Casualty Counts in Mass Shootings: The Plausibility of Linkages

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Gary Kleck¹

Abstract

Do bans on large-capacity magazines (LCMs) for semiautomatic firearms have significant potential for reducing the number of deaths and injuries in mass shootings? The most common rationale for an effect of LCM use is that they allow mass killers to fire many rounds without reloading. LCMs are known to have been used in less than one third of 1% of mass shootings. News accounts of 23 shootings in which more than six people were killed or wounded and LCMs were known to have been used, occurring in the United States in 1994–2013, were examined. There was only one incident in which the shooter may have been stopped by bystander intervention when he tried to reload. In all of these 23 incidents, the shooter possessed either multiple guns or multiple magazines, meaning that the shooter, even if denied LCMs, could have continued firing without significant interruption by either switching loaded guns or changing smaller loaded magazines with only a 2- to 4-seconds delay for each magazine change. Finally, the data indicate that mass shooters maintain such slow rates of fire that the time needed to reload would not increase the time between shots and thus the time available for prospective victims to escape.

Keywords

mass shootings, gun control, large-capacity magazines

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Introduction—Mass Shootings and Large-Capacity Magazines (LCMs)

There have been at least 23 shootings in which more than six victims were shot and one or more LCMs were known to have been used in the United States in the period 1994–2013. One of the most common political responses to mass shootings has been to propose new gun control measures, commonly focusing on “assault weapons” and LCMs. LCMs are detachable ammunition magazines used in semiautomatic firearms that are capable of holding more than a specified number (most commonly 10 or 15) rounds. For example, the 1994 federal assault weapons ban prohibited both (a) certain kinds of guns defined as assault weapons and (b) magazines able to hold more than 10 rounds (Koper, 2004). At least eight states and the District of Columbia similarly ban magazines with a large capacity, and still other states are considering bills to enact such restrictions (Brady Campaign to Prevent Gun Violence, 2013).

Theory The Rationale for LCM Bans

When supporters of bans on LCMs provide an explicit rationale for these measures, they stress the potential for such restrictions to reduce the death toll in mass shootings. And indeed there is a statistical association between LCM use and the casualty count in mass shootings (Koper, 2004), though it is unknown whether this reflects an effect of LCM use or is merely a spurious association reflecting the offender’s stronger intention to harm many people. If there is a causal effect, how would it operate? Does possession of LCMs somehow enable aggressors to shoot more victims, above and beyond the ability conferred by the use of semiautomatic guns equipped with smaller capacity detachable magazines? (A semiautomatic firearm is a gun that fires a single shot for each pull of the gun’s trigger, but automatically causes a fresh round to be loaded into the gun’s firing chamber.)

Possession of LCMs is largely irrelevant to ordinary gun crimes, that is, those with fewer victims than mass shootings, because it is extremely rare that the offenders in such attacks fire more rounds than can be fired from guns with ordinary ammunition capacities. For example, only 2.5% of handgun crimes in Jersey City, NJ, in 1992–1996 involved over 10 rounds being fired (Reedy & Koper, 2003, p. 154). Even among those crimes in which semiautomatic pistols were used, and some of the shooters were therefore likely to possess magazines holding more than 10 rounds, only 3.6% of the incidents involved over 10 rounds fired. Thus, if LCMs have any effect on the outcomes of violent crimes, it is more likely to be found among mass shootings with many victims, which involve unusually large numbers of rounds being fired.

Koper (2004) noted that “one of the primary considerations motivating passage of the ban on [LCMs]” was the belief that

semiautomatic weapons with LCMs enable offenders to fire high numbers of shots rapidly, thereby potentially increasing both the number of persons wounded per gunfire incident . . . and the number of gunshot victims suffering multiple wounds, both of which would increase deaths and injuries from gun violence. (p. 80)

This summary was as much a rationale for restricting semiautomatic guns as it was for limits on magazine capacity, but Koper also concluded that “an LCM is arguably the most important feature of an AW. Hence, use of guns with LCMs is probably more consequential than use of guns with other military-style features” (p. 80). He then went on: “By forcing AW and LCM offenders to substitute non-AWs with small magazines, the ban might reduce the number of shots fired per gun, thereby reducing both victims shot per gunfire incident and gunshot victims sustaining multiple wounds” (p. 81).

It is reasonable to expect fewer people shot if fewer rounds were fired, but Koper did not explain why, for example, the use of three 10-round magazines would result in fewer shots fired than if a 30-round magazine were used. After all, three 10-round magazines and one 30-round magazine both contain 30 cartridges and thus allow 30 shots to be fired. Semiautomatic guns do not fire any faster when they have a larger magazine inserted in them than when they have a smaller magazine, nor is the lethality of any one shot affected by the size of the magazine from which it came. A limit on the number of cartridges that the shooter could fit into any *one* magazine would not limit the total number of rounds of ammunition that a would-be mass shooter could bring to the scene of their crime, or even the total number loaded into multiple detachable magazines.

The main difference between a 30-round magazine and three 10-round magazines, however, is that a shooter equipped with three 10-round magazines would have to change magazines twice in order to fire 30 rounds, while a shooter with a 30-round magazine would not have to change magazines at all. This presumably is what Koper (2004) meant when he wrote that “semiautomatic weapons with LCMs enable offenders to fire high numbers of shots rapidly” (p. 80).

Thus, it could be the *additional magazine changes* necessitated by the use of smaller magazines that might reduce the number of people hurt in mass shootings. Advocates of LCM bans argue that, if LCMs were not available, would-be mass murderers would shoot fewer people because they *would have to reload more often* due to the more limited capacities of the magazines that would then be legally available. A spokesperson for the Violence Policy Center (2011), for example, argued that “High-capacity ammunition magazines facilitate mass shootings by giving attackers the ability to fire numerous rounds without reloading.”

It is not, however, self-evident why this should be so. Skilled shooters can change detachable magazines in 2 seconds or less, and even relatively unskilled persons can, with minimal practice, do so in 4 seconds (for a demonstration, see the video at <https://www.youtube.com/watch?v=ZRCjY-GtROY>, which shows a 2-seconds magazine change by an experienced shooter). Certainly, additional magazine changes do not increase the time needed to fire a given number of rounds by much.

Why, then, might inducing more magazine changes reduce casualty counts? Two explanations have been offered. First, during an additional interval when the shooter was forced to change magazines, *bystanders might tackle the shooter and prevent any further shooting*. Bystanders are presumably more willing to tackle a shooter while the shooter was reloading because it would be safer to do so—a shooter armed with only

one loaded gun would not be able to shoot those seeking to intervene during the effort to reload. A shooter equipped only with smaller capacity magazines would have to change magazines sooner and would therefore presumably shoot fewer people before he was tackled by the bystanders.

Second, additional magazine changes could extend the time interval between some of the shots, thereby *allowing more prospective victims to safely escape the scene* than otherwise would have been the case had the possession of LCMs enabled the shooter to reload less often.

These scenarios are plausible as logical possibilities, but have they actually occurred in the past often enough for it to be plausible that they would happen with some nonnegligible frequency in the future? If the past is any guide to the future, the credibility of any expectation of future benefits from LCM restrictions would rely heavily on how often these scenarios have actually played out in past mass shootings. This research is intended to test the plausibility of these possible causal linkages between LCM use and the casualty counts of mass shootings by closely examining the relevant details of such crimes. In particular, it was intended to estimate the share of mass shootings in which LCM use could plausibly have affected the casualty count.

Prior Research on LCMs

No one has actually tested whether mass shooters with LCMs fire more rounds than those without LCMs. We only have evidence indirectly bearing on this issue. Koper reported data showing that there are more *gunshot wound victims* in incidents in which the offender used an LCM (Koper, 2004, p. 86). The meaning of this statistical association, however, is unclear since one would expect it to exist even if LCM use had no causal effect on either the number of shots fired or the number of victims shot. The association is at least partly spurious if the deadliness of the shooter's intentions affects both his selection of weaponry (including magazines) and the number of shots he fires or persons he wounds.

It is a virtual tautology that the deadliness of the shooter's intentions affects the number of people hurt, unless one is prepared to assert that there is no relationship whatsoever between violent intentions and outcomes. While it is certainly true that outcomes do not match intentions perfectly, it is unlikely that there is no correlation at all.

The deadliness of a would-be mass shooter's intentions, however, is also likely to affect preparations for the shooting, such as accumulating many rounds of ammunition, acquiring multiple guns and multiple magazines, and selecting larger magazines rather than smaller ones. Accounts of mass shootings with high death tolls routinely describe the shooters making elaborate plans for their crimes, well in advance of the attacks, and stockpiling weaponry and ammunition (e.g., see Office of the State's Attorney 2013, regarding the Sandy Creek elementary school shootings; *Washington Post* "Pa. Killer had Prepared for 'Long Siege,'" October 4, 2006, regarding the Amish school killings in Lancaster, PA; Virginia Tech Review Panel, 2007, especially pp. 25–26, regarding the shootings at Virginia Tech; "Before gunfire, hints of bad

news,” *New York Times* August 27, 2012, regarding the Aurora Colorado movie theater shootings). In short, people who intend to shoot many people are not only more likely to end up doing so but also prepare for doing so by acquiring equipment that they believe is better suited to this task.

The most direct indication that the intentions of mass shooters are more deadly than those of the average gun aggressor, aside from the number of casualties inflicted itself, is the percentage of wounded victims who were killed rather than nonfatally wounded. The data gathered for the present study indicate that in 23 LCM-involved mass shooting incidents, a total of 197 gunshot victims were killed and 298 were nonfatally wounded, for a fatality rate of 40.0%. In contrast, Cook (1985, p. 96) reported that police reports on general samples of shootings indicated that about only 15% of those wounded by gunshot were killed. Thus, the lethality of gunshot wounds inflicted by mass shooters is about 2.7 times as high as for shootings in general. Any one shot fired from a gun equipped with a larger capacity magazine is no more deadly or accurate than one fired from a gun with a smaller capacity magazine, so it is implausible that LCMs affect this fatality rate (deaths/persons wounded) by enabling shooters to more accurately hit vital areas of a victim’s body where wounds are more likely to be fatal. Indeed, if those who suggest that shooters with LCMs fire faster than other shooters are correct, accuracy would be worse in LCM-involved shootings.

Thus, it is more likely that the high fatality rate in mass shootings is a product of the aggressor’s stronger intentions to shoot more people, though it could also be partly a product of the greater use of rifles and shotguns in mass shootings (25 of the 66 guns used in these incidents [38%] of known gun type were rifles or shotguns; in comparison, only 8% of all U.S. gun homicides in 2014 were committed with rifles or shotguns—U.S. Federal Bureau of Investigation [FBI], 2015). This too could be an indication of greater shooter lethality, since rifles and shotguns are, on average, more lethal than handguns (Kleck, 1984). In sum, mass shooters appear to have more lethal intentions as aggressors, apart from any advantages they may gain from use of LCMs.

There is therefore sound reason to question whether a simple bivariate association between LCM use and number of shots fired, or victims wounded, in a mass shooting reflects a causal effect of LCM use. Unfortunately, there is no known way to directly measure the lethality of shooters’ intentions at the time of their shootings, so we cannot simply statistically control for lethality of intentions in order to isolate the effect of LCM use. On the other hand, it would become more plausible to conclude that LCM use made its own contribution to the casualty count of shootings, above and beyond the effects of the apparently more lethal intentions of their users, if there was some evidence that either (a) significant numbers of mass shootings were disrupted by bystanders intervening when the shooters attempted to reload detachable magazines or (b) magazine changes increase the time intervals between shots fired, thus potentially allowing more prospective victims to escape to safety. This article provides a close examination of the details of mass shootings so as to cast light on these and related issues.

Method

Definition of Eligible Incidents

We tried to identify, as comprehensively as possible, all mass shootings that occurred in the United States in the 20-year period from 1994 through 2013 inclusive and that were known to have involved an LCM. An LCM was defined as a magazine holding more than 10 rounds of ammunition. A mass shooting was defined as one in which more than six people were shot, either fatally or nonfatally, in a single incident. Any specific numerical cutoff is necessarily somewhat arbitrary, but some are less arbitrary than others. The six-victim cutoff was used because an offender could shoot as many as six persons using a typical old-fashioned six-shot revolver of the sort that has been around since the 19th century, and our goal was to identify all incidents in which it was plausible that use of an LCM (always used in connection with modern semiautomatic firearms) affected the number of casualties. It is less likely that LCMs affect the casualty count in incidents in which few people were shot, and generally fewer rounds were fired, since the rationale for banning LCMs is that they permit shooters to fire many rounds without reloading, and thereby kill or injure more victims (Koper, 2004). Thus, had the numerical cutoff been set lower, the sample of incidents would have included more cases in which LCM use was unlikely to have affected the number of victims. In that way, we have intentionally biased the sample in favor of the hypothesis that LCM use causes a higher casualty count.

We partly relied on a list compiled by the staff of the Violence Policy Center (2015) to identify LCM-involved mass shootings. Because this organization advocates bans on LCMs (Violence Policy Center, 2011), we are confident its staff were well motivated to compile as comprehensive a list as possible so as to better document the need to restrict magazine capacities. Our search of NewsBank and the other compilations of mass shootings that we cite (see Data Sources section) did not uncover any additional qualifying incidents. It is nevertheless logically impossible to know for certain that all qualifying incidents were included.

We did not employ the oft-used definition of “mass murder” as a homicide in which four or more victims were killed, because most of these involve just four to six victims (Duwe, 2007), which could therefore have involved as few as six rounds fired, a number that shooters using even ordinary revolvers are capable of firing without reloading. LCMs obviously cannot help shooters who fire no more rounds than could be fired without LCMs, so the inclusion of “nonaffectable” cases with only four to six victims would dilute the sample, reducing the percentage of sample incidents in which an LCM might have affected the number of casualties. Further, had we studied only homicides with four or more dead victims, drawn from the FBI’s Supplementary Homicide Reports (SHR), we would have missed cases in which huge numbers of people were shot, and huge numbers of rounds were fired, but three or fewer of the victims died. For example, in one widely publicized shooting carried out in Los Angeles on February 28, 1997, two bank robbers shot a total of 18 people—surely a mass shooting by any reasonable standard (Table 1). Yet, because none of the people they shot died, this incident would not qualify as a mass murder (or even murder of

Table I. Mass Shootings in Which Shooter(s) Used Magazines With a Capacity Over 10 Rounds, United States, 1994–2013.^a

Shooter(s)	Date	Number of Shooters		Number of Guns	Number of Magazines	Capacity of Largest Magazine		Shooter(s) Reloaded?	Number of Shots Fired		Seconds Per Shot		Number Killed		Number Nonfatal Wounded	
Dean A. Enberg	June 20, 1994	1	2	4	4	70	70	?	43–56	<6			4		23	
Larry Phillips, Jr., and Em Matasareanu	February 28, 1997	2	6	9+	9+	100	100	Yes	1,101	2.40			0		18	
Matthe Johnson and Andrew Goden	March 24, 1998	2	13	3	3	30	30	?	30	?			5		11	
K. P. K. Nke	May 21, 1998	1	3	3+	3+	50	50	Yes	51	?			2		15	
Dylan K. Ebo and Eric Harris	April 20, 1999	2	4	16	16	52	52	Yes	188	15.64			13		21	
Larry Gene Ashbrook	September 15, 1999	1	2	6	6	15	15	Yes	>100	6.00			7		7	
Byran Koj Uyesug	November 2, 1999	1	1	3	3	15	15	?	10	180.0			7		0	
Michael McDermott	December 26, 2000	1	3	4+	4+	30	30	Yes	37	10.54			7		0	
Terry Ratzmann	March 12, 2005	1	1	3	3	15?	15?	Yes	22	<2.7			7		4	
Seung-Hu Cho	April 16, 2007	1	2	19	19	15	15	Yes	174	53.79			32		23	
Robert Hawkins	December 5, 2007	1	1	2	2	30	30	?	>30	12.00			8		5	
Steven Kazmierczak	February 14, 2008	1	4	6+	6+	33	33	Yes	56	5.36			5		21	
Jeremy Wong	April 3, 2009	1	2	3	3	30	30	Yes	99	?			13		4	
George Sodn	August 4, 2009	1	4	3+	3+	30	30	?	50	?			3		9	
Nada Hasan	November 5, 2009	1	2	15	15	30	30	Yes	214	?			13		38	
Timothy Hendron	January 7, 2010	1	4	3+	3+	Probable LCM	Probable LCM	?	115	c. 18			3		5	
Omar Thornton	August 3, 2010	1	2	4	4	17	17	?	19	9.47			8		2	
Jared Loughner	January 8, 2011	1	1	4	4	33	33	No ^b	31	0.45			6		13	
Eduardo SANCAN	September 6, 2011	1	3	3	3	30	30	Yes	60+	1.42			4		14	
James Holmes	July 20, 2012	1	4	4	4	100	100	Yes	76	4.74			12		58	
Michael Page	August 5, 2012	1	1	3	3	19	19	Yes	33+	?			6		3	
Andrew Engdner	September 27, 2012	1	1	2	2	15	15	Yes	46+	16.3			6		2	
Adam Lanza	December 14, 2012	1	4	12+	12+	30	30	Yes	154+	1.56			26		2	

Note: Details of these incidents and citations to news accounts used as sources may be found in the appendix to an extended version of this article, with the same title, on the Social Science Research Network, at http://papers.ssrn.com/sol3/papers.cfm?abstract_id=270066. LCM = large-capacity magazine; c = circa, i.e. approximate; ? = unknown.

^aNumber of guns is the number in the shooter's immediate possession, not necessarily the number fired. Number of magazines is the number of detachable magazines in the shooter's immediate possession. The number includes magazines in loaded semiautomatic firearms. "Seconds per shot" is the average time interval between shots through the period of shooting. ^bShooter was prevented from reloading a defective magazine by bystanders taking him.

any kind). Exclusion of such incidents would bias the sample against the proposition that LCM use increases the number of victims by excluding incidents with large numbers of victims.

We also excluded shootings in which more than six persons were shot over the entire course of the incident, but the shootings occurred in multiple locations with no more than six people shot in any one of the locations, and substantial periods of time intervened between episodes of shooting. An example is the series of killings committed by Rodrick Dantzler on July 7, 2011. He killed seven people and wounded two others, but did so in three different locations over a 5-hr period, shooting no more than four people in any one of the locations. Since shooters in these types of incidents have ample time to reload between sets of shots even without LCMs, use of an LCM is less likely to be relevant to the casualty counts than in a mass shooting as defined herein.

It is not possible to compare shootings involving LCMs with shootings not involving LCMs, because no source of information on shooting incidents, whether news media reports or police offense reports, systematically establishes which shootings did *not* involve LCMs. Thus, it is impossible to distinguish (a) shootings in which the perpetrator did not use an LCM from (b) shootings in which the perpetrator *did* use an LCM, but this fact was not mentioned in the account of the incident. Consequently, we are necessarily limited to describing incidents that were affirmatively identified as involving LCMs. In any case, since our purpose was to establish how often LCM use affects casualty counts in mass shootings, even if we could identify incidents that definitely did not involve LCMs, they would be irrelevant to this narrow purpose because they are obviously cases in which LCM use could not have affected casualty counts.

Data Sources

We relied on news stories to identify mass shootings and get information on their details. Relying on news outlets has obvious limits, since some mass shootings get little news coverage beyond a few stories by news outlets near the shooting location, and it is possible that none of the writers of these few stories used even one of the common words and phrases we used in our database searches. Further, even multiple news accounts of widely reported incidents may not include crucial details of the incidents, especially the number of shots fired and the duration of the shooting. Also, early news accounts of shootings are sometimes inaccurate in their details (Huff-Corzine, Corzine, Jarvis, Tetzlaff-Bemiller, Weller, & Landon, 2014), so we consulted later stories on a given incident (often pertaining to the trial of the shooter) in addition to early ones. Excluding the early news stories, we found that reported details of mass shootings were extremely consistent across stories. Fortunately, the known biases of news coverage of crime mostly work in favor of our goal of covering shootings in which many shots were fired, since news coverage is biased in favor of reporting incidents with larger numbers of victims (Duwe, 2000).

The alternative of using police reports was not feasible because such reports are not publicly available for a large share of homicides. Relying on the FBI's SHR would be

even worse than news accounts for our purposes, because this source says nothing about the number of rounds fired, number of guns used, details about the guns used (beyond whether they were handguns, rifles, or shotguns), number of magazines used, or the capacity of magazines used for *any* homicide incidents, whereas news stories provide such information for many mass shootings. These same deficiencies apply to data from the FBI's National Incident-based Reporting System, which have the additional disadvantage of covering only part of the nation.

A variety of sources were used to identify eligible incidents. First, as previously noted, we consulted "Mass Shootings in the United States Involving High-Capacity Ammunition Magazines," a fact sheet compiled by the Violence Policy Center, available online at http://www.vpc.org/fact_sht/VPCshootinglist.pdf. This source only covers incidents known to involve magazines with a capacity of 10 or more rounds.

Second, we searched the NewsBank Infoweb online database which covers hundreds of print, broadcast, and online news outlets, including newspapers, news magazines, transcripts of television news programs, and online-only news providers, in every state in the nation. We searched for articles whose text (including headlines) included any of the following phrases: "mass shooting," "massacre," mass murder, "shooting spree," or "rampage" for the 20-year period from January 1, 1994, through December 31, 2013.

Third, we consulted the following existing compilations of mass shootings, mass murders, and "active shooter incidents" (and the sources they cited) to identify potentially relevant shooting incidents:

- "US Mass Shootings, 1982–2012: Data from Mother Jones' (2013) Investigation," created by the staff of *Mother Jones* magazine, available online at <http://www.motherjones.com/politics/2012/12/mass-shootings-mother-jones-full-data>. This source only covers incidents in public places with four or more dead, and therefore misses those with many victims shot but three or fewer of them fatally as well as incidents occurring in private places. It also includes some spree shootings in which only a few victims were shot in any one location.
- "Analysis of Recent Mass Shootings" (September 2013), compiled by Mayors Against Illegal Guns, and available online at <http://www.demandaction.org/detail/2013-09-updated-analysis-of-recent-mass-shootings>. This covers incidents only for January 2009 to September 2013, and only those with four or more dead victims, thereby excluding those with many victims shot, but three or fewer shot fatally.
- Bjelopera, Bagalman, Caldwell, Finklea, and McCallion (March 18, 2013). *Public Mass Shootings in the United States: Selected Implications for Federal Public Health and Safety Policy*. Washington, DC: Congressional Research Service. This source only covers incidents occurring in public places and with four or more deaths, thereby excluding cases with many victims shot but three or fewer fatally as well as those occurring in private places.
- Citizens Crime Commission of New York City. "Mass Shooting Incidents in America (1984–2012)," at <http://www.nycrimcommission.org/mass-shoot>

ing-incidents-america.php, accessed January 15, 2014. This source covers shootings with four or more persons killed, with a magazine capable of holding more than 10 rounds. It excludes cases with no known use of LCMs, and incidents with many victims shot but three or fewer killed.

Notwithstanding the use of these multiple sources, we cannot be certain of achieving absolutely complete coverage of all LCM-involved mass shootings. Most of the sources rely, directly or indirectly, on news media accounts of the incidents, and some of these shootings received little coverage beyond local news outlets and perhaps an Associated Press state wire service story. The fewer news stories reporting an incident, the more likely it is that there were no stories containing any of the commonly used phrases for which we searched. The mass shootings most likely to receive little news coverage are those with fewer than four victims killed. Most of the lightly covered incidents we discovered also involved fewer than 10 victims shot, fatally or nonfatally.

On the other hand, it is unlikely that we missed many large-scale shootings, because these are likely to be well covered by multiple news outlets. Since those we missed are likely to involve fewer victims, it is also less likely that an LCM was needed for shooting as many people as were shot in these incidents. Omission of these cases, therefore, biases the sample in favor of the hypothesis that LCMs affect casualty counts.

As a check on the completeness of coverage of our methods, we used the FBI's SHRs data to identify all SHR-covered U.S. homicides that involved more than six dead victims and the use of firearms (not just those involving LCMs). These SHR data sets cover about 90% of U.S. homicides. For the period 1994–2013, we identified 17 qualifying incidents in the SHR data sets. We then checked to see if our search methods would have identified these cases. We found that searches of the NewsBank database alone identified all 17 of these incidents. Thus, shootings with many dead victims clearly are completely covered by the news media.

Once eligible incidents were identified, we searched through news accounts for details related to whether the use of LCMs could have influenced the casualty counts. Specifically, we searched for (1) the number of magazines in the shooter's immediate possession, (2) the capacity of the largest magazine, (3) the number of guns in the shooter's immediate possession during the incident, (4) the types of guns possessed, (5) whether the shooter reloaded during the incident, (6) the number of rounds fired, (7) the duration of the shooting from the first shot fired to the last, and (8) whether anyone intervened to stop the shooter.

Findings

How many mass shootings were known to have been committed using LCMs? We identified 23 total incidents in which more than six people were shot at a single time and place in the United States from 1994 through 2013 and that were known to involve use of any magazines with capacities over 10 rounds. Table 1 summarizes key details of the LCM-involved mass shootings relevant to the issues addressed in this article.

What fraction of all mass shootings are known to involve LCMs? There is no comprehensive listing of all mass shootings available for the entire 1994–2013 period, but the most extensive one currently available is the one at the Shootingtracker.com website, which only began its coverage in 2013. For 2013, this database identified 31 incidents in which more than six victims were supposedly killed or injured. This source includes deaths or injuries of perpetrators in their counts of “victim” deaths and injuries and also counts as victims’ persons who were shot at, but not hit. Correcting these flaws eliminated six of the incidents as mass shootings, while another three incidents were spree shootings. Eliminating these nine ineligible incidents left 22 genuine mass shootings. The Shootingtracker database itself does not record LCM use, but examination of news media accounts indicated that none of these 22 incidents in 2013 were known to involve use of an LCM. For 2013, the Violence Policy Center (2015) identified just one shooting with more than six victims killed or injured that involved an LCM, but this incident was a spree shooting in which eight people were shot in three different widely spaced locations, with no more than three shot in any one of the locations (the June 7, 2013, incident in Santa Monica, CA). Thus, there apparently were zero mass shootings in 2013 known to involve LCMs.

To put these numbers in perspective, for the United States as a whole in 2013, there were an estimated 14,196 people killed in murders and nonnegligent manslaughters (MNNM) involving any weapon types, 9,795 of them killed with firearms (U.S. FBI, 2014b). There were an estimated 13,349 mnnm incidents,¹ of which just 3 involved more than six dead victims, 12,675 involved a single dead victim, and 13,346 involved six or fewer dead victims (U.S. Department of Justice Federal Bureau of Investigation, 2015). The 22 qualifying shooting incidents identified by Shooting Tracker as involving more than six victims therefore accounted for less than one sixth of 1% of homicide incidents and victims killed in those incidents claimed less than one tenth of 1% of homicide victims.

One might speculate that there were significant numbers of mass shootings in which LCMs were used, but not a single news account mentioned the LCM use. The use of LCMs has been a major focus of gun control advocacy groups and national news outlets since at least 1989, when a Stockton California schoolyard shooting led to the nation’s first state-level assault weapons ban (Kleck, 1997, chap. 4). In this light, it seems unlikely that LCM use in a mass shooting would go completely unreported in all news accounts, but it cannot be ruled out as a logical possibility. It is, however, irrelevant to our analyses unless shootings with unmentioned LCM use are systematically different from those that explicitly mentioned LCM use—a speculation we cannot test.

LCMs are sometimes defined as magazines holding over 10 rounds, sometimes as those holding over 15 rounds (Koper, 2004). For our entire 20-year study period of 1994–2013, 23 mass shootings were known to involve LCMs using the more inclusive cutoff of 10 rounds, that is, at least one round was fired during the incident from a gun equipped with a magazine capable of holding more than 10 rounds. Using the more stringent cutoff of more than 15 rounds, 20 incidents were known to involve LCMs.

Thus, LCM-involved mass shootings are known to have occurred an average of once per year in the United States over this 20-year period.

How often have bystanders intervened while a mass shooter was trying to reload? How many times people have disrupted a mass shooting while the shooter was trying to load a detachable magazine into a semiautomatic gun? Note that it is irrelevant whether interveners have stopped a shooter while trying to reload some other type of gun, using other kinds of magazines, since we are addressing the potential significance of restrictions on the capacity of detachable magazines that are used only with semiautomatic firearms. Thus, bystander intervention directed at shooters using other types of guns that take much longer to reload than a semiautomatic gun using detachable magazines could not provide any guidance as to the likelihood of bystander intervention when the shooter was using a semiautomatic gun equipped with detachable magazines that can be reloaded very quickly. Prospective interveners would presumably be more likely to tackle a shooter who took a long time to reload than one who took only 2- to 4-s to do so. Likewise, bystander interventions that occurred at a time when the shooter was *not* reloading (e.g., when he was struggling with a defective gun or magazine) are irrelevant, since that kind of bystander intervention could occur regardless of what kinds of magazines or firearms the shooter was using. It is the need to reload detachable magazines sooner and more often that differentiates shooters using smaller detachable magazines from those using larger ones.

For the period 1994–2013 inclusive, we identified three mass shooting incidents (with or without LCM use) in which it was claimed that interveners disrupted the shooting by tackling the shooter while he was trying to reload. In only one of the three cases, however, did interveners actually tackle the shooter while he may have been reloading a semiautomatic firearm. In one of the incidents, the weapon in question was a shotgun that had to be reloaded by inserting one shotshell at a time into the weapon (*Knoxville News Sentinel* “Takedown of Alleged Shooter Recounted” July 29, 2008, regarding a shooting in Knoxville, TN on July 27, 2008), and so the incident is irrelevant to the effects of detachable LCMs. In another incident, occurring in Springfield, OR, on May 21, 1998, the shooter, Kip Kinkel, was using a semiautomatic gun, and he was tackled by bystanders, but not while he was reloading. After exhausting the ammunition in one gun, the shooter started firing another loaded gun, one of the three firearms he had with him. The first intervener was shot in the hand in the course of wresting this still-loaded gun away from the shooter (*The (Portland) Oregonian*, May 23, 1998).

The final case occurred in Tucson, AZ, on January 8, 2011. This is the shooting in which a man named Jared Loughner attempted to assassinate Representative Gabrielle Giffords. The shooter was using a semiautomatic firearm and was tackled by bystanders, purportedly while trying to reload a detachable magazine. Even in this case, however, there were important uncertainties. According to one news account, one bystander “grabbed a full magazine” that the shooter dropped, and two others helped subdue him (Associated Press, January 9, 2011). It is not, however, clear whether this bystander intervention was facilitated because (1) the shooter was reloading or

because (2) the shooter stopping firing when his gun or magazine failed to function properly. Eyewitness testimony, including that of the interveners, was inconsistent as to exactly why or how the intervention transpired in the Giffords shooting. One intervener insisted that he was sure the shooter had exhausted the ammunition in the first magazine (and thus was about to reload) because he saw the gun's slide locked back—a condition he believed could only occur with this particular firearm after the last round is fired. In fact, this can also happen when the gun jams, that is, fails to chamber the next round (Morrill, 2014; Salzgeber, 2014).

Complicating matters further, the *New York Times* reported that the spring on the second magazine was broken, presumably rendering it incapable of functioning. Their story's headline and text characterized this mechanical failure as “perhaps the only fortunate event of the day” (*New York Times* “A Single, Terrifying Moment: Shots, Scuffle, Some Luck,” January 10, 2011, p. A1). If the *New York Times* account was accurate, the shooter would not have been able to continue shooting with that magazine even if no one had stopped him from loading it into his gun. Detachable magazines of any size can malfunction, which would at least temporarily stop a prospective mass shooter from firing, and thereby provide an opportunity for bystanders to stop the shooter. It is possible that the bystander intervention in the Tucson case could have occurred regardless of what size magazines the shooter possessed, since a shooter struggling with a defective small-capacity magazine would be just as vulnerable to disruption as one struggling with a defective LCM. Thus, it remains unclear whether the shooter was reloading a functioning magazine when the bystanders tackled him.

The real significance of LCM use in the Gabrielle Giffords shooting is that the first magazine that the shooter used had a capacity of 33 rounds, and the shooter fired 31 times before being tackled. Had he possessed only a 15-round magazine, and bystanders were willing to intervene when the shooter either reloaded or struggled with a defective magazine, he would have been able to fire at most 16 rounds (including one in the firing chamber)—15 fewer than the 31 he actually fired before he was stopped, for whatever reason. Consequently, instead of the 19 people he shot (6 fatally, 13 nonfatally), it would be reasonable to estimate that he would have shot only about half as many victims. Thus, the absence of an LCM might have prevented three killings and six or seven nonfatal gunshot woundings in this incident.

The bystander intervention in the Giffords shooting was, however, unique, and occurred only because there were extraordinarily courageous and quick-thinking bystanders willing and able to tackle the shooter. Over a 20-year period in the United States, the Tucson incident appears to be the only known instance of a mass shooter using a semiautomatic firearm and detachable magazines in which the shooter was stopped by bystanders while the shooter may have been trying to reload such a magazine. All other mass shootings have instead stopped only when the shooter chose to stop and left the scene, the shooter committed suicide, or armed police arrived and forced the shooter to stop (see U.S. FBI, 2014a).

The use of multiple guns and multiple magazines. Restrictions on LCMs obviously could not have affected mass shootings in which no LCMs were used, so it is just those that

Table 2. Summary of Key Characteristics of Mass Shootings (>6 Shot) With Large Capacity Magazines, United States, 1994–2013.

Key Characteristics of the Incidents	Mass Shootings With Magazines Over 10 Rounds (<i>n</i> = 23)			Mass Shootings With Magazines Over 15 Rounds (<i>n</i> = 20)		
	Yes	No	Not Reported	Yes	No	Not Reported
Multiple guns	17 (74/74%)	6	0	15 (75/75%)	5	0
Multiple magazines	23 (100/100%)	0	0	20 (100/100%)	0	0
Both multiple guns and multiple magazines	17 (74/74%)	6	0	15 (75/75%)	5	0
Either multiple guns or multiple magazines	23 (100/100%)	0	0	20 (100/100%)	0	0
Shooter reloaded	14 (88/61%)	2	7	12 (86/60%)	2	6

Note. First number in parentheses after each frequency is the percentage of incidents with nonmissing information that had the indicated attribute. The second number in parentheses is the percentage of all incidents, including those for which the relevant information was missing, that had the indicated attribute.

involved LCMs that are relevant to judging the benefits that might have accrued had LCMs been unavailable at the beginning of the study period. As previously noted, there is considerable evidence that people who commit large-scale shootings, unlike most ordinary aggressors, devote considerable advance planning to their crimes. Part of their preparations entails cumulating multiple guns, multiple magazines, and many rounds of ammunition. The significance of this is that, in cases where the shooter has more than one loaded gun, he can continue firing, without significant pause, even without LCMs, simply by switching to a loaded gun. Alternatively, if he has multiple small magazines rather than LCMs, the shooter can continue firing many rounds with only a 2- to 4-s pause between shots for switching magazines.

Table 2 displays how often LCM-involved mass shootings involved shooters using either multiple guns or multiple magazines. Of 23 such incidents using the “more-than-10-rounds” criterion, the shooters possessed more than one gun in 17 incidents (74%), leaving six cases in which it was known that the shooter possessed just one gun. Of 20 incidents using the more-than-15-rounds criterion, the shooters possessed more than one gun in 15 incidents (75%), leaving five cases in which it was known that the shooter possessed just one gun.

Of 23 mass shootings with LCMs (>10 rounds), offenders were known to possess multiple detachable magazines in all 23 incidents (100%). Likewise, of the 20 mass shootings with magazines holding over 15 rounds, all 20 involved shooters with multiple magazines.

The average number of magazines in the immediate possession of offenders in incidents in which magazines with a capacity greater than 10 were possessed was at least 5.78 (Table 1). These offenders could have continued firing, even if they had possessed only one gun, with only the interruptions of 2–4 s that it would take for each magazine change.

In sum, there were no mass shootings in the United States in 1994–2013 known to have involved LCMs in which the shooter did not possess either multiple guns or multiple detachable magazines. In all mass shootings in which the shooters were known to have possessed one or more LCMs, the shooters could have either continued firing many rounds without any interruption at all simply by switching loaded guns or could have fired many rounds with only very brief interruptions of 2–4 s to change detachable magazines.

The offenders in LCM-involved mass shootings were also known to have *reloaded* during 14 of the 23 (61%) incidents with magazine holding over 10 rounds. The shooters were known to have *not* reloaded in another 2 of these 20 incidents, and it could not be determined if they reloaded in the remaining seven incidents. Thus, even if the shooters had been denied LCMs, we know that most of them definitely would have been able to reload smaller detachable magazines without interference from bystanders since they in fact did change magazines. The fact that this percentage is less than 100% should not, however, be interpreted to mean that the shooters were *unable* to reload in the other nine incidents. It is possible that the shooters could also have reloaded in many of these nine shootings, but chose not to do so, or did not need to do so in order to fire all the rounds they wanted to fire. This is consistent with the fact that there has been at most only one mass shooting in 20 years in which reloading a semiautomatic firearm might have been blocked by bystanders intervening and thereby stopping the shooter from doing all the shooting he wanted to do. All we know is that in two incidents, the shooter did not reload, and news accounts of seven other incidents did not mention whether the offender reloaded.

Do more magazine changes allow more prospective victims to escape? An alternative rationale for why limiting aggressors to smaller magazines would result in fewer casualties in mass shootings is that the increased number of magazine changes necessitated by use of smaller magazines would create additional pauses in the shooting, allowing more potential victims to escape than would otherwise escape. For example, a story in the *Hartford Courant* about the Sandy Hook elementary school killings in 2012 was headlined “Shooter Paused, and Six Escaped,” the text asserting that as many as six children may have survived because the shooter paused to reload (December 23, 2012). The author of the story, however, went on to concede that this was just a speculation by an unnamed source, and that it was also possible that some children simply escaped when the killer was shooting other children. There was no reliable evidence that the pauses were due to the shooter reloading, rather than his guns jamming or the shooter simply choosing to pause his shooting while his gun was still loaded.

The plausibility of the “victims escape” rationale depends on the average rates of fire that shooters in mass shootings typically maintain. If they fire very fast, the 2–4 s it takes to change box-type detachable magazines could produce a slowing of the rate of fire that the shooters otherwise would have maintained without the magazine changes, increasing the average time between rounds fired and potentially allowing more victims to escape during the between-shot intervals. On the other hand, if mass

Table 3. Known Rates of Fire in Mass Shootings, 1994–2013.

Date of Incident	Shots Fired ^a	Time of Firing (Minutes) ^a	Average Shots Per Minute	Average Seconds Per Shot	Number of Guns
June 20, 1994	>50	c. 5	>10	<6.0	2
February 28, 1997	1,101	44	25	2.4	4
April 20, 1999	188	49	3.8	15.8	4
September 15, 1999	>100	10	>10.0	<6.0	2
September 2, 1999	10	<30	>0.33	<180.0	1
May 24, 2000	c. 7	<90	>0.08	<771.4	1
September 22, 2000	9+	<10	>0.9	<66.7	1
December 26, 2000	37	5–8 (6.5)	5.7	10.5	3
February 5, 2001	25–30 (27.5)	8–15 (11.5)	2.4	25.1	4
March 5, 2001	c. 24	6	c. 4.0	c. 15.0	1
March 12, 2005	22	<1	>22.0	<2.7	1
March 21, 2005	45	9	5.0	12.0	3
March 25, 2006	9+	c. 5	>1.6	<33.3	2
October 2, 2006	17–18 (17.5)	c. 2	c. 8.75	c. 6.9	2
April 16, 2007	c. 174	156	c. 1.11	c. 53.8	2
October 7, 2007	30	c. 1	c. 30.0	c. 2.0	3
December 5, 2007	>30	c. 6	>5.0	<12.0	1
February 14, 2008	56	5	11.1	5.4	4
January 7, 2010	115	30	3.8	15.7	4
August 3, 2010	19	3	6.3	9.5	2
January 8, 2011	31	0.25	125	0.48	1
September 6, 2011	60+	1.42	42.3+	1.4	3
July 20, 2012	76	c. 6	12.7	4.74	4
September 27, 2012	46+	14	>3.3	<18.3	1
December 14, 2012	154+	4	38.5+	1.6	3

Note. c. circa.

^aWhere a range was provided in news accounts, the midpoint of the range (shown in parentheses) of shots fired or time of firing was used in rate-of-fire computations.

shooters fire their guns with the average interval between shots lasting *more* than 2–4 s, the pauses due to additional magazine changes would be no longer than the pauses the shooter typically took between shots even when not reloading. In that case, there would be no more opportunity for potential victims to escape than there would have been without the additional magazine changes.

Table 3 displays data on rates of fire for LCM-involved mass shootings in 1994–2013. Information on both the duration of the firing and the number of rounds fired was available for 17 of the 23 incidents shown in Table 1 plus another 8 mass shootings for which the necessary information was available but that did not involve any known LCM use. Reliable information on duration of fire may well be unavailable from any source for many mass shootings. There are rarely audio recordings that would provide precise information on the duration of fire (as there were in the 2012 Aurora Colorado movie

theater shooting), so eyewitness estimates are usually the basis for establishing this. On the other hand, there is often quite reliable information on the number of rounds fired, since semiautomatic firearms eject an empty shell casing after each round is fired. When shooters use such guns, crime scene investigators can (absent removal of the evidence by the offender or souvenir hunters) establish the number of rounds fired by counting cartridge casings recovered at the scene.

Average rate of fire was computed as the average number of seconds between shots. In the 25 incidents for which average rates of fire could be determined, shooters never maintained an average rate of fire anywhere as fast as that at which their firearms were capable of firing. Shooters firing as fast as the gun allows can easily fire three rounds per second with a typical semiautomatic firearm, that is, with only about one third of a second between rounds. In only three incidents were mass shooters known to have averaged less than 2 s between rounds. This is no more than one sixth of the maximum rate of fire of which semiautomatic guns are capable (see Table 3, incidents occurring on January 8, 2011, September 6, 2011, and December 14, 2012). This means that taking 2 s to reload a detachable magazine would not have slowed the shooters' average rate of fire at all in 22 of the 25 incidents for which rate of fire could be established and would have only slightly slowed the rate in the remaining three incidents.

It cannot be assumed, however, that in the three incidents in which usually high rates of fire were maintained, use of smaller magazines would have slowed the rate of fire due to a need to change magazines more often. Shooters possessed multiple guns in two of these three relatively rapid fire incidents (those occurring on September 6, 2011 and December 13, 2012), which means that, rather than needing to change magazines to continue shooting, the aggressors could simply have switched guns, from one firearm emptied of rounds to another loaded firearm, without pausing in their shooting at all. Over the 20-year study period, there was just one LCM-involved mass shooting incident in the United States in which a shooter maintained an average rate of fire with less than 2 s elapsing between shots, *and* possessed only a single gun—the shooting involving Jared Loughner (on January 8, 2011), who was stopped from further shooting when he was tackled by bystanders.

In sum, in nearly all LCM-involved mass shootings, the time it takes to reload a detachable magazine is no greater than the average time between shots that the shooter takes anyway when not reloading. Consequently, there is no affirmative evidence that reloading detachable magazines slows mass shooters' rates of fire, and thus no affirmative evidence that the number of victims who could escape the killers due to additional pauses in the shooting is increased by the shooter's need to change magazines.

Conclusions

In light of the foregoing information, it is unlikely that the larger number of rounds fired in the average LCM-linked mass shooting found by Koper (2004) was in any sense caused by the use of LCMs. In all but one of such cases in the period from 1994 through 2013, there was nothing impossible or even difficult about the shooter firing

equally large numbers of rounds even if he had possessed only smaller capacity magazines, since the same number of rounds could easily have been fired with smaller detachable magazines of the sort that would remain legally available under LCM bans. Instead, the larger number of rounds fired by LCM-using shooters is more likely to reflect the more lethal intentions prevailing among such shooters, just as their planned use of multiple guns and multiple magazines, and the unusually high fatality rate (deaths over total woundings) of their attacks are outward indications of a desire to shoot many people. Unfortunately, there are no known methods for reliably measuring the lethality of shooters' intentions independent of the outcomes of their crimes, making it impossible to statistically control for this factor in a multivariate statistical analysis and thereby isolate the effects of LCM use.

One cannot prove a negative, and it is possible that mass shooters in the future might be different from those in the past, and that would-be mass shooters, unlike those of the past, would not obtain multiple guns or multiple smaller capacity magazines as substitutes for LCMs. One might also speculate that incidents that did *not* end up with many shooting victims turned out that way because the shooter did *not* use an LCM. At this point, however, there is little sound affirmative empirical basis for expecting that fewer people would be killed or injured if LCM bans were enacted.

Focusing gun control efforts on mass shootings makes sense from a political standpoint, since support for gun control is elevated following highly publicized gun crimes. Such efforts, however, are less sensible for purposes of reducing the death toll from gun violence, especially if they focus on technologies rarely used in gun crime as a whole. Controls aimed at reducing ordinary forms of firearm violence, such as shootings with just one or a few victims, are more likely to have large impacts on the aggregate gun violence death toll for the simple reason that nearly all victims of gun violence are hurt in incidents with a small number of victims. For example, less than 1% of U.S. homicide incidents in 2013 involved more than two victims killed (U.S. Department of Justice Federal Bureau of Investigation, 2015).

Most types of gun control focus on preventing more dangerous people from acquiring, possessing, or using *any* type of gun, and therefore have potential to prevent a wide array of gun crimes. A prime example is a law requiring background checks on persons seeking to buy guns. Gun laws with a background check component, such owner license and purchase permit laws, have been found to be potentially effective in reducing homicide (Kleck & Patterson, 1993, p. 274). There is already a federal law requiring background checks, but it only applies to purchases from licensed gun dealers. Extending these checks to cover private gun transfers—that is, implementing a federal universal background check (Kleck, 1991, pp. 433–435)—is far more likely to prevent significant numbers of gun crimes than measures aimed at rarely used gun technologies like LCMs and extremely rare types of violent incidents like mass shootings.

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Supplementary Material

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Note

1. Supplementary Homicide Reports (SHR) data for 2013 indicate that there were an average of 1.063 victims per SHR covered homicide incident, implying 13,349 incidents.

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Author Biography

Gary Kleck is the Emeritus David J. Bordua Professor of Criminology and Criminal Justice at Florida State University, having retired after 38 years at FSU. He has won the Michael J. Hindelang Award for Point Blank, testified to Congress and state legislatures on gun control, and served on numerous national task forces and panels. He is currently completing a book, with Brion Sever, on the effects of legal punishment on crime.

EXHIBIT 55

For Collectors Only

Revised 2nd edition

U.S. M1 Carbines

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Craig Riesch



A part-by-part examination
of M1 Carbines

Determine if your M1 Carbine
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M1 Carbine

Conventions

The following conventions have been applied throughout this book. The origin, function and manufacturing peculiarities of each part of the M1 Carbines are described in the text. Manufacturer, serial number range of use and manufacturer's codes are then contained in "parts charts" on facing pages.

All parts of the M1 Carbine are referred to by their official U.S. Ordnance Department name. Where collectors have applied another name which is in common usage that name is noted.

The use of Type I, Type II, etc. to describe variations in parts is for convenience only and does not necessarily reflect U.S. Ordnance Department or manufacturer's usage.

All markings as they appear on M1 Carbine parts are shown in **Bold** type in the text (but not the charts) and between quotation marks. A slash (/) between **Bold-faced** markings in quotation marks indicates one line above another.

Line drawings are used in preference to photographs to emphasize certain aspects of the part illustrated. Where necessary, more than one view of the part is shown.

Finally, an M1 Carbine Survey Sheet has been included in Appendix J which can be copied freely to identify parts on any M1 Carbine. The form is divided into two sections; one allows you to list all parts currently on a carbine as you find it, and the second to list all the parts that need to be replaced to return the carbine to factory-original condition.

How To Use the Parts Charts

- * There is one part chart for every major part of the M1 Carbine.
- * Parts charts are organized by manufacturer along the Y-axis and part variation across the X-axis.
- * Part variations are divided into Type I, Type II, etc., to describe changes during manufacture and service life.
- * At the intersection of each row and column, the approximate

M1 Carbine

serial number range of usage is given as well as manufacturer or other markings appearing on the part.

The collector using these charts can quickly determine whether or not the parts on any given M1 Carbine are correct for any particular manufacturer and for the serial number shown on the receiver.

It should be noted that although there were ten manufacturers of M1 Carbines, Irwin-Pedersen was unable to perform. Their contract and a sizeable inventory of parts was assumed by the Saginaw Steering Gear Division of General Motors which took over operations at the Irwin-Pedersen plant in Grand Rapids. Parts manufactured at the Saginaw Grand Rapids plant are coded S'G' (S prime, G prime). Parts with (S'G') markings have been observed very early in the serial number range assigned to Irwin-Pedersen and Irwin-Pedersen ("IP") marked parts have been seen late in the serial number range assigned to Saginaw S'G'. For instance, receiver Serial #1767223 (early IP range) was coded S'G'. It may have been manufactured to replace a scrapped Irwin-Pedersen receiver. The collector should keep in mind that no Irwin-Pedersen M1 Carbines were ever accepted by the U.S. Ordnance Department.

The collector is cautioned that there were two "Saginaw" manufacturers of M1 Carbines: Saginaw Steering Gear Division, Saginaw, Michigan (SG) and Saginaw Steering Gear Division, Grand Rapids (S'G'), both were divisions of General Motors. Collectors however tend to treat M1 Carbines manufactured by Saginaw, Saginaw (SG) as distinct and separate from those manufactured by Saginaw, Grand Rapids (S'G').

Finally, the serial numbers shown in the following Parts Charts are approximations only and indicate a range where a part started its use. Many parts also saw short periods of mixed use as new types were implemented and the existing parts were used up. Additionally, some contractor purchased parts from more than one subcontractor at the same time. For example, the stamped, brazed trigger housing and milled trigger housings could appear in the same serial number range.

Remember these points when using the Parts Charts and have fun collecting the M1 Carbine!

EXHIBIT 56

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CMP gets M1 Carbines (that you can order, right now)

Posted February 1, 2016 in [Companies](#), [Daily News](#), [News](#), [Other Gear & Gadgets](#), [Rifles](#) by [Miles](#) with [56 Comments](#)

Tags: [cmp](#), [culture](#), [history](#), [M1 Carbine](#), [military](#)



Unlike the previous hysteria and excitement about the [1911s from the CMP earlier](#), this news is actually quite concrete. I asked the CMP booth about the 1911s while at SHOT, and the answer was that even though the President signed that act into place that allows the CMP to accept 1911s from the Army, it still doesn't mean that the Army has to give them up at all. So real bummer until future notice. Anyways, CMP has a number of full stock M1 Carbines up for sale, all from a number of original World War Two era manufacturers. I assume that this is due to the recent legislation. The carbines can be mail ordered on February 1st, and can be bought in person at either the Port Clinton store in Ohio, [or the Anniston store in Alabama](#). Although all the shipping will be from the Anniston store. If you live in either Ohio or Alabama, the morning of February 4th might be a good time to take off work or school, if you want an original M1 Carbine for a good price. They are all available on a first come, first serve basis, with no preference to the manufacturer. In addition, Field grade and Service grades are the only types being offered, Field for \$625, and Service for \$685.

[Privacy](#) - [Terms](#)

*“Monday, February 1, we will begin accepting orders for a limited number of M1 Carbines for mail order. Two grades will be available, Service and Field. They include the following manufacturers; Inland, Winchester, IBM, Quality Hardware, Saginaw, Standard Product and Underwood. The manufacturer you receive will be luck of the draw, please no requests. **Each customer is limited to one total Carbine this year.** You will not be allowed to purchase both a Service and Field Grade. You may put down your first choice and second choice. We DO NOT time stamp orders, we only date stamp them. All orders received the same day are put in one basket. Please do not call about your order. If information is needed for your order, our sales department will contact you. Be sure to complete the checklist for the order before you send it in. Questions about orders already in-house slow down our processing which means it takes longer to send out the end product. If your payment method is a check, we will not deposit your check until your order is processed. However, some may go on backorder. You will be contacted prior to depositing your check should your order be placed on a backorder list. To be placed on the backorder list, you must have a form of payment with your order.*

Due to limited quantities we may come across, M1 Carbines, M1Carbine barreled Receivers, Bavaria-Marked M1 Carbines and M1A1 Paratrooper Carbines will be offered on the [CMP Auction Site HERE.](#)

Each M1 Carbine rifle sold by CMP is an authentic U.S. Government rifle that has been inspected, headspaced, repaired if necessary and test fired for function. Each rifle is shipped with safety manual and chamber safety flag.

Free S&H – continental U.S. Contact CMP for additional S&H – Alaska, Hawaii & Puerto Rico

NOTE: Carbines will not be sold or shipped with magazines, slings or oilers.

Store Availability: On February 4, our stores in Anniston, Alabama, and Port Clinton, Ohio will have an extremely small quantity of M1 Carbines available. They will be on a first come first serve basis. No Carbines will be held and purchases must be completed that day. In the store, you will be limited to one type of Carbine. If you have placed a mail order, then decide to visit the store, your mail order will not be honored.

”





Infantry Marine, based in the Midwest. Specifically interested in small arms history, development, and usage within the MENA region and Central Asia. To that end, I run **Silah Report**, a website dedicated to analyzing small arms history and news out of MENA and Central Asia.

Please feel free to get in touch with me about something I can add to a post, an error I've made, or if you just want to talk guns. I can be reached at miles@tfb.tv

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Got it

Comments for this thread are now closed



56 Comments

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Best

Newest

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Avata

This comment was deleted.



J

Jeebus

→ Guest

8 years ago

And now on Gunbroker for double the price.

9

0

Share ›



K

Kirk Newsted

8 years ago

"I assume that this is due to the recent legislation."

Umm,no. If you frequent the CMP site and forum you would know that the carbines have been at Anniston since about 2013 being prepped for sale. Recent legislation has nothing to with the carbines.

3

0

Share ›



B

Bub

8 years ago

My application for one of the limited number of M1 Carbines should arrive at CMP today. I know it's a long shot of scoring one of these, but well worth the effort. M1 Carbines are blasts to shoot. Not the world's most accurate guns and the sights can be a pain, but who cares.

2

0

Share ›



jeffrey melton

8 years ago

I traded car parts for a GM produced M1 carbine in the late '70s, I kept it until '95 and sold it for \$350. It looked brand new and was packed in cosmoline when I first got it. Seeing the prices today I wish I'd kept it.



1 0 Share ›

M**mookie**

8 years ago

All sold out already(mail orders) ,each store will have 35 on Thursday the 4th,first come fist serve.

1 0 Share ›

**Evil13RT**

8 years ago

Getting one of these in the VI is a serious hat trick.
You'd need a coupon in that caliber before ordering, and just getting that can take months.
Plus they're trying to pass a new law restricting guns to calibers smaller than "what the police use" (because someone seriously thinks 223 is larger than 308 and 9mm).

1 0 Share ›

**Ken**

➔ Evil13RT

8 years ago

223 is high powered, didn't you know?

2 0 Share ›

**iksnilol**

➔ Ken

8 years ago

Oh noes, about 1300 joules of energy

Oh the humanity, how can such destructive devices be allowed?

0 0 Share ›

**iksnilol**

8 years ago

I just wish 30 Carbine wasn't such an oddball cartridge. Would make these things useful.

:/

0 0 Share ›

**Doom**

➔ iksnilol

8 years ago

reload, straight wall cartridges are very easy to reload.

0 0 Share ›

**iksnilol**

➔ Doom

8 years ago

Yeah, but kinda hard with little time/usefulness.

Why bother when 5.56 or 7.62x39 costs slightly more to buy?

0 0 Share ›



Doom

→ iksnilol



8 years ago

not too many M1 Carbines come in 5.56 or 7.62x39 :P

Plus reloading straight wall cartridges is very fast, easy, and cheap and I get very accurate ammo tailored to my gun. My .38 special loads are spot on in my model 10.

0 0 Share ›



iksnilol

→ Doom



8 years ago

Yeah, it is easy and whatnot but I hate being dependent on uncommon stuff.

Same reason I passed up the 9mm Steyr. Cool gun but depends on reloading ammo.

0 0 Share ›



Doom

→ iksnilol



8 years ago

That is why you have a gun in a common caliber for the rooty tooty point n shooty times, but then can have less common caliber using guns for fun or interest. I have an Arisaka I have yet to shoot since i need to get the reloading supplies gathered up, but once I do it will pay off quick since pre loaded 7.7 is like 35-50 dollars a box of 20 rounds and I can reload it for 5 dollars a box of 20...

I guess if you just own guns for defense then that is up to you, but I collect as well as have them for defense, so reloading is a great choice.

on top of that, I can reload common calibers for much cheaper than buying them, .38, .357 magnum, .44 mag, etc etc are way cheaper to reload for. only rounds you might not save much/ anything on is 9mm FMJ or steel cased rifle rounds.

1 0 Share ›



iksnilol

→ Doom



8 years ago

I can see that one. Just in Norway is that you have to have a reason for owning something.

Still, I would like to rechamber an M1 Carbine. Think the action could handle 7.62x39? I mean, if we adjusted the gas system?

0 0 Share ›



Doom

→ iksnilol



8 years ago

No way, it is too small for such a thing, maybe if you basically redesigned it but at that point it would pretty much be a Mini 30.

.30 carbine is basically a pistol round, and the charging handle on an m1 Carbine is so light even a child could easily charge it.

a 7.62x39 based M1 carbine would have to be majorly upsized and use much tougher springs.

I hate lot of things about US gun laws, but I sure am glad there are no limits on the amounts own-able or needing reasons to own them. at least in a free state like Indiana.

A 9mm version may work well though, Someone even made one in 9mm, but it inst anything like an M1 Carbine on the inside.

1 0 Share ›



iksnilol

→ Doom



8 years ago

Mini 30 is more like an M1 Garand. Whilst the "M1 Carbine" in 9mm is just a blowback rifle.

Maybe if the rifle was slightly enlarged? I dunno, why bother? There's plenty of rifles out there. The KelTec Su16 is interesting to me.

0 0 Share ›



Doom

→ iksnilol



8 years ago

for sure it is more like an M1 garand, I just meant by time you up scaled everything it may as well be a mini 30. Most of KelTecs guns are very interesting and innovative, unfortunately they dont make very many, cost a lot for the less common kinds, and are fairly cheaply made, a lot of plastic and screws unfortunately, but they sure do look cool.

I like the SU 16's and really want one of those M43 rifles they are making. too bad the MSRP is an absolutelv insane 3000

dollars...

1 0 Share ›



iksnilol → Doom



8 years ago

Yeah, and in Europe getting a Kel-Tec rifle is very hard. As in "why the actual [expletive] would you bother with it?" hard.

Wouldn't mind one of those SU16s, maybe a "high-tech" version made to a higher standard with better materials?

0 0 Share ›



Doom → iksnilol



8 years ago

They are hard enough to find in the US lol, I can imagine it being even worse on a long trip across the Atlantic.

I would like several keltec guns, but they are kind of ugly with all the screws on them. apparently they made a sub 2000 a long time ago out of aluminum, but it cost more. it would probably be worth it in my opinion, my desire to own a plastic gun ends at my Glock. and even then there isnt a single screw on my glock, so at least there is that. lol

KelTec really curses itself with its low production rates and sub par materials, they are an extremely innovative company.

1 0 Share ›



iksnilol → Doom



8 years ago

I kinda get why they do it though.

They were burned once due to loans and thus they don't want to expand with loans. Understandable IMO, and weirdly enough they are one of the top US producers.

0 0 Share ›



Doom → iksnilol



8 years ago

not hard to believe they are one of the top producers when you see a million PF9's and P3AT's at every gun store, but their rifles are unobtainium. I never knew they had loan problems, you wouldnt think they would have any trouble getting a loan now unless that damned "operation chokepoint" makes getting gun loans much harder. They could really rake in the money if they

loans much harder. They could really take in the money if they could meet consumer demand.

1 0 Share ›



iksnilol → Doom

— 🚩

8 years ago

Ah, you misunderstood. They don't want to expand their factory through loans. As I understand they tried with loans once and things went bad. So now they only expand with what they have. Playing it overly safe in other words.

0 0 Share ›



Doom → iksnilol

— 🚩

8 years ago

Oh, I see, so either way they will take forever to expand and meet production demand lol... whats another 10 years to get one of their rifles second hand?

0 0 Share ›



iksnilol → Doom

— 🚩

8 years ago

I guess so.

0 0 Share ›



Rodney Steward

— 🚩

8 years ago

Well I'm lucky, the CMP Anniston Store is just 25 miles from my house and have been looking at the M1 Grands but the PRICE is OUT OF SITE!!!

0 0 Share ›



law-abiding-citizen → Rodney Steward

— 🚩

8 years ago

I'm luckier - in a manner of speaking. My dad had 3 of them - 2 reproductions, 1 service rifle. I took the service rifle, let my brother & brother-in-law have the nicer condition reproduction models. Unplanned result, mine was the only one with a bayonet lug. We each also got about 1,100 rds of ammo for our rifles. Now I just need to find a sling for my rifle.

0 0 Share ›



Rodney Steward → law-abiding-citizen

— 🚩

8 years ago

About 3 months ago I got invited to go to a range on an old Fort and shoot with a club. and they were shooting the Grands. and that is one sweet

with a star, and they were shooting the Grands, and that is the sweet weapon! They wanted me to join and I'm still thinking about it but it is NOT CHEAP!!!! They travel around to different places and shoot against other groups, but you have to shoot in at least 3 matches per year and have your own weapon and like I said it is NOT CHEAP! I have the little M1 Carbine and it's sweet, but that 30-06 Grands is SWEETER!!

0 0 Share ›



law-abiding-citizen

→ Rodney Steward



8 years ago

My dad got a Garand through the program at Camp Perry. My nephew got that one. Wish my dad would have passed on the knowledge while he was still here.

0 0 Share ›



Rodney Steward

→ law-abiding-citizen



8 years ago

I know what you mean friend, I lost my hero about 5 months ago and still have some trouble dealing with it, but it's the cycle of life, that's what I keep telling myself. We'll find us a Garands somewhere that we can afford!!

0 0 Share ›



Swarf

8 years ago

According to the website, they are sold out.

How does that happen?

0 0 Share ›



Swarf

→ Swarf



8 years ago

Ticketmaster.

2 0 Share ›

S

steve norton

→ Swarf



8 years ago

The email went out Thursday afternoon saying they were accepting orders today. Everybody sent out orders Thursday and Friday.

1 0 Share ›

K

Kirk Newsted

→ Swarf



8 years ago

Its called supply v. demand. They had so many orders they ran out quick.

1 0 Share ›



Vizzini

8 years ago

Ohio started allowing deer hunting with modern rifles in straight-walled cartridges a couple years ago and I was disappointed to find out that .30 carbine is not one of the allowed rounds. Which is pretty odd, because it's mid-range in power among the allowed rounds, which go down to rounds as anemic as .38 Special and up to big game rounds like .45-70 or .450 Marlin.

0 0 Share ›



Tom → Vizzini

8 years ago

I can understand why .30 Carbine might be a no no for deer, but not in a world that permits .38 special. Sure .38 can be loaded hot and with modern bullets blah blah blah... but then again so can .30 Carbine and its got a whole lot more to work with from the get go.

2 0 Share ›



Vizzini → Tom

8 years ago

Exactly.

I, personally, wouldn't trust .38 special for deer, when there are so many better options, but it's right there on the ODNR website, so it sets a pretty low bar.

1 0 Share ›



Bill → Vizzini

8 years ago edited

I'll have to make some calls, that must be a mistake. For handguns ODNR used to be notorious for barrel length, caliber and so forth, Because I find their website essentially unnavigable, are you sure it wasn't .38 Super?.

OTOH, we just found 4 poached whitetails all done in with .22s. The game protector said 3 were killed with 1 shot, the forth with three, two of which were in non-vital areas.

.30 Carbine belongs on the list.

0 0 Share ›



Vizzini → Bill



8 years ago edited

Here, in the section under allowable hunting equipment:

<http://wildlife.ohiodnr.gov...>

"Straight-walled cartridge rifles in the following calibers: .357 Magnum, .357 Maximum, .38 Special, .375 Super Magnum, .375 Winchester, .38-55, .41 Long Colt, .41 Magnum, .44 Special, .44 Magnum, .444 Marlin, .45 ACP, .45 Colt, .45 Long Colt, .45 Winchester Magnum, .45 Smith & Wesson, .450 Marlin, .454 Casull, .460 Smith & Wesson, .45-70, .45-90, .45-110, .475 Linebaugh, .50-70, .50-90, .50-100, .50-110, and .500 Smith & Wesson."

In fact, laughably, .38 Super isn't on the list! (But, I don't think there are actually any rifles chambered in .38 Super).

Edit to add: The handgun regulations are actually less restrictive, as they just give a minimum caliber: "With 5-inch minimum length barrel, using straight-walled cartridges .357 caliber or larger."

But that definition still rules out .30 carbine and includes .38 special!

1 0 Share ›

J

Jeebus

8 years ago

Hey guys, can someone clue me in: Does being a veteran count as a qualifier for "Membership in a CMP affiliated organization" or just for "participation in marksmanship" part? Can't find an exact answer.

0 0 Share ›

J

Jeebus

→ Jeebus

8 years ago

Nevermind, I'm an idiot- it's right on the order form XD

3 0 Share ›

D

DB → Jeebus

8 years ago

Thought it was, just wanted to give a quick answer. Takes more than just vet, which sucks!

0 0 Share ›

A

adverse → Jeebus

8 years ago

Done that before.

0 0 Share ›

D

DB → Jeebus

— 🚩

8 years ago

I understand a veteran with correct/proper paperwork counts. Exactly what they want.....

0 0 Share ›

J

Jim_Macklin

→ Jeebus

— 🚩

8 years ago

Your state association membership, KSRA, ISRA, etc; a concealed carry license, a qualification card from the NRA or IDPA, IPSC, etc.

NRA membership is not required by CMP.

As a Senior senior citizen who owned an M1 Carbine about 1960, the attraction was TV and WWII and Korean war movies. It was nice that surplus ammo was cheaper than .22LR.

0 0 Share ›



Avata

This comment was deleted.

—

J

Jim_Macklin

→ Guest

— 🚩

8 years ago

I recommend NRA membership

www.nra.org

I also suggest everybody who can gets a concealed carry license and contacts their Congress member and Senators and ask for support of National Reciprocity..

It is a set toward restoration of full Second Amendment rights.

0 0 Share ›



Avata

This comment was deleted.

—



Budogunner

→ Guest

— 🚩

8 years ago

Last I checked there was an online m1 Garand collectors club that qualified. I can't remember the name but a quick Google should find it. Small membership fee and they send out regular newsletters.

3 0 Share ›

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EXHIBIT 57

M1 Carbines Incorporated



Post WWII Commercially Manufactured M1 Carbines



Introduction

Companies & Carbines

Basic Nomenclature

Replacement Parts

Safety Issues

Books

Links

About Us

Discussion Forum

U.S. Carbines of WWII

Occupation Carbines

Introduction

The companies listed below link to a web page specific to that company. I have not limited these companies to the ones who made .30 caliber carbines, though most manufactured their rifles in this caliber. The companies that manufactured M1 carbine look-a-likes as air rifles, .22 long rifle, .22 Magnum, .256 Winchester Magnum, and 5.7mm Johnson are included. If a rifle was/is made to look like a U.S. GI M1 carbine, it qualifies. Some of the air rifles and .22's were made for training purposes for the military or police of other nations, then became available commercially.

Many of these companies sold parts, receivers, and barrels individually. Some of the commercial carbines that are encountered are a conglomeration of parts from more than one manufacturer, often including original GI parts.

Credits

This website has been made possible by the assistance of many carbine owners who have stepped forward to help present this information for you.

War Baby Comes Home by Larry Ruth has a chapter devoted to the commercial carbine manufacturers. He is the only person who has attempted to tackle this subject on a large scale, and was doing this while many of the companies were still in business. His book include interviews with employees and/or management of some of the companies. I highly recommend *War Baby and War Baby Comes Home* to anyone interested in M1 carbines.

If I use anything from Ruth's work here, I say so. The majority of my work has built on what Ruth has done. I prefer to use Ruth's information when it is needed to clarify something or make significant connections, without plagiarizing it and without using it alone. I am in contact with Ruth and share/compare with him. The idea is to cooperate and brainstorm for the purpose of understanding and documenting the history of the commercial carbines, something Ruth has been doing far longer than me.

The Companies

This project is ongoing over time.

Company	Link	Carbine Years	Calibers
ALM, Inc. Houston, TX		2004-2005	.30 carbine
Alpine Industries Los Angeles, CA		1962-1965	.30 carbine
AMAC Jacksonville, AR		1990-1992	.30 carbine

American Historical Foundation Richmond, VA		1985 & ongoing	customizes GI and commercial carbines made by others
AMPCO Miami, FL		1960	.30 carbine
Armscorp USA Baltimore, MD		2003	.30 carbine receivers
Auto-Ordnance Worcester, MA		2005-current	.30 carbine
Bullseye Gun Works Miami, FL		1960-1962	.30 carbine
Chiappa Firearms (Citadel) Brescia, Italy		current	.22 long rifle 9mm
Crosman Air Guns Fairport, NY		1966-1976	air rifles
Erma's Firearms Manufacturing Co. Steelville, MO		1962-1964	.30 carbine (WARNING - see web pages)
ERMA-Werke Dachau, Bavaria		1966-1996	.22 long rifle .22 Winchester Magnum Rimfire (WMR)
Federal Ordnance South El Monte, CA		1980-1982 1985-1986	.30 carbine
Firearms International (F.I.) Houston, Texas		1995-1996	.30 carbine
Fulton Armory Savage, MD		current	.30 carbine
Global Arms		1962-1966?	.30 carbine
H & S		1962-1963	.30 carbine
HOWA Nagoya, Japan		1960's-1980's	.30 carbine

Inland Manufacturing Dayton, OH		2015-current	.30 carbine
Israel Arms International (IAI) Houston, Texas		1996-2002	.30 carbine .22 Spitfire (5.7mm Johnson)
Iver Johnson's Arm's Middlesex, NJ & Jacksonville, AR		1978-1992?	.30 carbine .22 long rifle, .22 Magnum Rimfire 5.7mm Johnson 9mm
Johnson Arms Inc. New Haven, CT		1963-1967	5.7mm Johnson
Johnston-Tucker Arms Co. St. Louis, MO		1965-1966?	.30 carbine .22 LR .256 Winchester Magnum .22/30 (5.7mm Johnson)
Liberty Armory Liberty, TX		1995-2000	.30 carbine .22 Carbine (5.7mm Johnson)
Mannlicher Sporting (unk location)		unknown	.30 carbine
Millville Ordnance Co. Union, NJ		1962	.30 carbine
National Ordnance Azusa, CA South El Monte, CA		1960-1974	.30 carbine
NATO Atlanta, Georgia		1981?	.30 carbine
Plainfield Machine Co. Dunellen, NJ		1962-1978	.30 carbine .22 Carbine (5.7mm Johnson)
Rock Island Armory Inc. Colona & Geneseo, IL		1979-1983	.30 carbine receivers
Rockola Firearms (James River Armory) Halethorpe, MD	Pending	2013-2019	.30 carbine
Rowen, Becker Company, Inc. Waterville, OH		1961-1963	.30 carbine (WARNING - see web page)
Santa Fe Division Golden State Arms Pasadena, CA		1960's	refer web page

Springfield Armory Inc. Geneseo, IL		1997-2002?	.30 carbine receivers
Steelville Manufacturing Co. Steelville, MO		1965-1966	.30 carbine
Texas Armament Co. Brownwood, TX		unknown	.30 carbine
Tiroler Sportwaffenfabrik und Apparatenbau GmbH Kufstein, Austria		1960's	air rifle
Tri-State Tool & Die Frostburg, Maryland Roxbury, Pennsylvania		1960's	refer web page
Universal Firearms Corp. Hialeah, FL		1962-1987	.30 carbine .256 Winchester Magnum .44 Magnum
William's Gun Sight Co. Davison, MI		1966	.30 carbine
An Unknown		unknown	.30 carbine

EXHIBIT 58

[Review] Browning Hi-Power | A Great Time Tested Handgun

 lynxdefense.com/reviews/browning-hi-power

Michael

Let us talk about a legendary pistol, the Browning Hi-Power, one that you likely recognize and has really stood the test of time.

Obviously, we are talking about the one and only Browning Hi-Power. If you aren't familiar with the Browning Hi-Power, you really should be.



Recently Springfield Armory has announced the Springfield Armory SA-35 which is a remake of the iconic Browning Hi-Power.

At Shot Show 2022, FN announced they would remake this gun as the FN Highpower with some new and improved features.

History of the Browning Hi-Power

So this gun goes back to 1935, this gun was John Browning's last design of a pistol.

Browning actually died before the Hi-Power was completed.

Browning died in 1926 and the gun had not really been adopted, by any country.

The Hi-Power is also called the P35, it's referred to as the P35 because it was released in 1935.

Browning had finished the 1911, and it was going strong, but the French were looking for a new pistol and they had set the requirements they were looking for.

When FN and Browning designed this gun, Browning couldn't use a lot of the things he had come up with for the 1911, the patents hadn't run out and he had sold them to Colt.

See the difference between the 1911 vs Hi-Power.

So John Browning had to go back to the drawing board for the Hi-Power.

The Hi-Power was adopted by the Belgium military in 1935.

At one point, most of the countries that belonged to NATO used it. However, the US was still using the 1911 at that time.

I can even remember Saddam Hussein carrying one and watching footage of him shooting the Hi-Power up in the air. I believe when he was captured the Hi-Power was the gun he had on him.

The Browning High-Power is arguably one of the most widely used pistols for police and military service in all of history.

The Browning Hi-Power has been used in 50+ countries for military and law enforcement use.

There is so much to be said about the Browning Hi-Power.

It's not really a debate whether or not it's a great pistol, it is.

Many historians would say that the Browning Hi-Power revolutionized pistol design.

The Browning Hi-Power has been in tons of conflicts around the world. It's a firearm that has been tested time and time again and no one can really calm that this is not a battle-tested firearm.

This pistol was originally designed by John Browning, but later finished and improved by his protege, Dieudonné Saive.

Saive is the same guy who also designed the FAL and many other firearms.

Saive is a very famous firearm designer and while his name may not be as well known as John Browning his guns surely are.



Browning Hi-Power

- Caliber: 9mm & .40
- Action: Semi-Auto
- Capacity: 13-15 Round

[Shop](#)

Browning Hi-Power Features

Let us talk about why you might want this pistol that was first released in 1935. We will discuss how it handles and shoots and the pros and cons of the pistol.



Now let's go over some of the Browning Hi-Power's features. There are a bunch of different models of the Hi-Power. Seeing how this gun was made in 1935, you can imagine, there have been a lot of changes to it over that time.

Size and Design

The first thing is first the size of the Browning Hi-Power and it might surprise you since older guns tend to be larger.

When you first pick up the Hi-Power you'll notice it's actually quite small. Especially if you compare it to modern handguns like Glock, Sig, or Smith and Wesson.

The overall design of the gun is quite nice the lines are elegant and clean. It's definitely something that sets it apart from modern guns. This gun's look and design is iconic and there's no mistaking a hi-power for anything model.

When you compare this gun to something like a Gen 5 Glock you know you're holding some substantial and time-tested.

Keep in mind, the Browning Hi-Power was designed at a time body types and the size people were different.

Due to that fact, the grip is a little bit smaller. But, for a lot of people, that might not be good, but for me, it's great because I have smaller hands.

So if you have medium-sized hands like myself, it fits well. If you've got small hands, it's going to be great.

There are options for making the grip better for people with larger hands so don't let this section scare you off of the Browning Hi-power.

Hi-Power Action

The first thing you'll notice about the action is that it's a single-action pistol.

Because the gun has a hammer; it's not striker-fired.



Some people, because there's no part blocking the hammer from hitting your hand, may get a little bit of hammer bite.

I haven't had that problem personally, but I know that some people have.

If you do get hammer bite from the Hi-Power, there are options for you to mitigate that issue.

If you aren't familiar with hammer bite, it's when you're firing the gun and the hammer comes back and hits the meat of your hand and starts gouging it.

Slide Stop

Moving over to the slide stop. On the Browning Hi-Power 9mm it's very easy to use.



Reaching the slide stop is a breeze and so sending the slide forward is incredibly easy.

Take Down

When it comes to taking down, you have the safety that you pull on so you simply pull the gun back.

Then you engage on that notch and you can simply push up on the slide stop, pull it out, hold the gun when you release the safety, and you can take the gun down.

It's extremely simple like most modern pistols.

Grip

Moving down the gun from the slide stop, let's talk about the grip.

Much like H&K guns I really like the Browning Hi-Power grip angle, and I think one of the main reasons that the Hi-Power has been a favorite for so long.

It just feels good and natural in your hand.

Getting the gun on target is easier with this very ergonomic grip. It's great during multiple strings of fire and goes back on target quickly and easily.

If you compare the Hi-Power to a Glock it's more aggressive which is good for recoil control.

Now, when it comes to the grip itself it could be better. The Browning Hi-Power comes with standard wood grips, people that are more comfortable with a Glock or other polymer framed gun won't like these grips.

There are tons of options for replacement grips. I know Uncle Mike's offer some rubber grips for the Hi Power

There are also many other grips that will pair well with this gun.



Browning Hi-Power

- Caliber: 9mm & .40
- Action: Semi-Auto
- Capacity: 13-15 Round

[Shop](#)

Magazine Release

The magazine release is small but easy to use.



With some handguns, you have to shift your grip to press the magazine release. But on the Hi-Power, I don't seem to have that issue.

Trigger

Moving on to the trigger. One of the unfortunate things in the Browning Hi-Power is because of patents that were still active at the time the 1911 trigger design that John Browning had designed before could not be used in the Hi-Power. So you won't be getting a 1911 style trigger in the Hi-Power.

So the Hi-Power trigger is probably going to feel like a bit of a letdown when you compare it to what you think a single action handgun trigger should be.



But the take-up on the gun is longer than a 1911. Feels a little bit shorter than a Glock.

The wall is very crisp but the issue with this trigger is the reset.

The reset isn't audible or tactile. So not only can you not hear the trigger reset but you can't feel it either. So the trigger ends up feeling somewhat squishy.

If you want to not slap the trigger during rapid-fire you may want to train with this gun a good bit.

Some argue that you need to release this trigger all the way. But I don't think that's a good idea and will like lead to slapping the trigger.

Feel free to disagree, but even with this guns trigger I would still not release the trigger all the way. I would rather learn where the reset is even though it lacks a good audible and tactile reset.

The lack of the audible and tactile reset on the Browning Hi-Power is a con for an otherwise really good handgun.



Browning Hi-Power

- Caliber: 9mm & .40
- Action: Semi-Auto
- Capacity: 13-15 Round

[Shop](#)

Sights

The sights on the Hi-Power are adequate. Like most handguns, you can of course change sights on some of the earlier Hi-Powers.

The military surplus Hi-Powers sights are very rudimentary and not great.



But fortunately, there are options when it comes to sights, so pick ones that work for you.

For many of these guns, the sights can be worn down but that will just depend on the gun.

Magazine

Originally, the Hi-Power magazine was 13 rounds.

There are 15 round and 17 round magazines that are available now.



Mec-Gar makes a great 15 round magazine for the Hi-Power. They are very reliable and don't cost an arm and a leg.

Magazine Disconnect

If you know the Browning Hi-Power, you know all about the magazine disconnect in the Hi-Power.

If you aren't familiar with the Hi-Power what the magazine disconnect does is when there is no magazine in the gun, you can't pull the trigger. Many other pistols have this feature including some Ruger and Smith and Wesson handguns.

The magazine disconnect can be removed if you want to have a better trigger experience.

There is some debate on whether or not you should remove the disconnect.

What's best for you is for you to decide but many report that the trigger pull is improved when you remove the magazine disconnect.



Browning Hi-Power

- Caliber: 9mm & .40
- Action: Semi-Auto
- Capacity: 13-15 Round

[Shop](#)

Accuracy

Now, the Browning Hi-Power has been tested a great deal.

Many argue that the Browning Hi-Power is a more accurate handgun than a lot of current service pistols.

Many people argue that this gun is more accurate than something like a Glock.

I can't say too much about the accuracy because I'm not an expert shooter by any stretch but I do okay for myself.

I'm not going to get too deep into the accuracy of the Hi-Power, because like I said I'm no expert I just love guns and shooting!

Shooting

What does it feel like to shoot the Browning Hi-Power?

The Browning Hi-Power is a very smooth relatively lightweight gun which makes it an extremely pleasurable shooting weapon.

If you compare it to polymer guns you're might bulk at the lightweight comment. But that wouldn't be fair considering this is an all-metal-framed pistol.

So compared to an unloaded Glock 17, the Browning Hi-Power is about 2.2 pounds unloaded. And the Glock 17... I had to look at my notes there... is 1.5 approximately unloaded. So the Browning Hi-Power does way more than the Glock, but that being said, what that means is that when you're firing the gun, it does absorb that recoil very well. It's easy to keep on target.

The Browning Hi-Power does lack some of the latest advancements like an accessory rail so you won't be attaching any type of weapon-mounted light to this gun. This can be annoying but there is workarounds but none as convenient and easy to deeply as a weapon-mounted light.



As you'd expect from a gun designed in 1935, it has some cons that newer guns don't have because of advancements in technology.

One thing we have all grown custom to having is flared magazine wells. This gun has no flare magazine well and so you'll have to ensure that you have perfectly lined up your magazine while reloading the pistol.

Don't expect to get extremely fast reloads with this gun like you would with a Glock with an aftermarket magazine well flare or even the 1911's.



Browning Hi-Power

- Caliber: 9mm & .40
- Action: Semi-Auto
- Capacity: 13-15 Round

[Shop](#)

Browning Hi-Power Final Thoughts

The Browning Hi-Power is a phenomenal pistol that has since been out-innovated, but it's still a pleasure to shoot.

It's expensive compared to a lot of handguns on the market today, but undoubtedly it has aesthetics and beauty often not found in modern handguns.

The trigger reset is really my biggest problem with the Browning Hi-Power. As I mentioned earlier, it just lacks the polish and feel you'd expect.

The only other issue is the possible hammer bite, but obviously, that depends on the person so it might not have any effect on you at all.

If you can I would suggest adding this pistol to your collection. You really can't go wrong with that.

You'll enjoy shooting it, there's no doubt.

Is it the best handgun now? Probably not.

Handguns like the Glock 19 and Glock 17 have proven themselves as workhorses.

But nothing can take away the fact this gun has been used around the world and involved in multiple conflicts and performed very well for nearly 86 years.

I have no doubt that if you get one of these, you're going to be happy.



Browning Hi-Power

- Caliber: 9mm & .40
- Action: Semi-Auto
- Capacity: 13-15 Round

Shop

Browning Hi-Power



Browning Hi-Power is a time tested pistol that has really shined even in it's old age. The Hi-Power is one for the history books.

Product SKU: 051004393

Product Brand: Browning

Product Currency: USD

Product Price: 1217.99

Product In-Stock: InStock

Editor's Rating:

4.3

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One comment

1. Really considering getting a Hi-Power for my first handgun, so thanks for all the info.

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EXHIBIT 59



Contents lists available at ScienceDirect

JSES International

journal homepage: www.jseinternational.org

Rate and time to return to shooting following arthroscopic and open shoulder surgery

Joseph W. Galvin, DO^{a,*}, John Slevin, PA-C^a, Henry H. Yu, MD^a, Eric K. Turner, MD^a, John M. Tokish, MD^b, Jason A. Grassbaugh, MD^a, Edward D. Arrington, MD^c

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ARTICLE INFO

Keywords:

Shoulder surgery

Arthroscopy

Shooting

Rifle

Return to shooting

Level of evidence: Level IV; Case Series; Prognosis Study

Background: There is limited information on return to shooting following shoulder surgery. The purpose of this study is to determine the rate and timing for resuming shooting a rifle following shoulder surgery.

Methods: We performed a retrospective review of prospectively collected data. The study included patients undergoing arthroscopic and open shoulder stabilization for unidirectional shoulder instability, and arthroscopic surgery for rotator cuff tears, SLAP lesions, biceps tendinopathy, and acromioclavicular pathology. Data collected included the laterality of surgery, shooting dominance, and patient reported outcome measures at the preoperative and postoperative visits. Starting at the 4.5 month clinic visit, patients were asked if they could shoot a military rifle.

Results: One hundred patients were identified with arthroscopic and open shoulder surgery with a mean age of 30 years (range, 18–45) and a mean follow up of 24 months (range, 12–32). The cohort consisted of patients undergoing arthroscopic Bankart repair (n = 23), arthroscopic posterior labral repair (n = 18), open Latarjet (n = 16), mini open subpectoral biceps tenodesis (OBT) (n = 25), OBT with open distal clavicle resection (DCR) (n = 10), open DCR (n = 4), and arthroscopic rotator cuff repair with concomitant OBT (n = 4). Significant improvement in SSV, VAS, ASES, and WOSI was shown at 1 year postoperative, SSV 85, VAS 2, ASES 85, WOSI 239, $P = .001$. The percentage of patients reporting the ability to shoot a military rifle postoperatively were 47%, 63%, 85%, and 94% at 4.5 months, 6 months, 1 year, and 2 years, respectively. At 4.5 months postoperatively, patients who underwent surgery ipsilateral to their shooting dominance (n = 59) had a rate of return to shooting (33%) versus shoulder surgery on the contralateral side of shooting dominance (n = 41) (60%), $P = .04$. However, there was no significant difference in the groups at 6 months and 1 year. Additionally, there was a significant difference in the rate of return to shooting at 6 months in patients undergoing arthroscopic posterior labral repair versus the remainder of the cohort (posterior instability (33%) vs. (69%), $P = .016$), and a significant difference between posterior shoulder stabilization and anterior shoulder stabilization (70%), $P = .03$.

Conclusion: Patients undergoing arthroscopic and open shoulder surgery have a high rate of return to shooting. Approximately 60% of patients resume shooting at 6 months postoperatively and 85% return at 1 year. Patients undergoing shoulder surgery on the contralateral side of their shooting dominance return to shooting significantly faster than those with shoulder surgery ipsilateral to their shooting dominance. Additionally, those undergoing arthroscopic posterior shoulder stabilization return to shooting at a slower rate than anterior stabilization surgery.

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Madigan Army Medical Center Institutional Review Board approved this study, IRB Protocol #221092.

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Shooting a rifle is a required task for many military athletes and law enforcement, and can be a leisure or competitive activity for civilian patients. Rifle shooting imparts a sudden anterior to posterior directed force against the anterior shoulder. This can lead to rare cases of symptomatic posterior shoulder instability.⁵

Additionally, the recoil of the rifle and the need to suspend and support the weapon with both upper extremities to successfully hit a target requires unique demands on both the affected and unaffected shoulder.¹¹ Rifle stability is achieved through compression of the buttstock against the shoulder while supporting the stock of the rifle with the contralateral arm through isometric elbow flexor contraction and shoulder forward elevation. Therefore, the dynamic task of rifle shooting involves a coordinated effort of the operative and nonoperative shoulder following shoulder surgery.

There is limited information on successful return to shooting following shoulder surgery. In fact, no prior studies have examined the rate or time to return to rifle shooting following shoulder surgery. This information would be valuable for military and law enforcement employers and patients, and also for patients seeking to understand the time to return to recreational and leisure shooting.

The purpose of this study is to determine the rate and timing for resuming shooting a rifle following arthroscopic and open shoulder surgery. We hypothesized that there would be a high rate of return to shooting a rifle following arthroscopic and open shoulder surgery.

Methods

After institutional review board approval, we performed a retrospective review of prospectively collected data from a single institution. The study included all active duty military patients, age 18 to 45 years old, undergoing arthroscopic and open shoulder stabilization for symptomatic unidirectional shoulder instability, as well as patients undergoing arthroscopic surgery for rotator cuff tears, superior labrum anterior to posterior (SLAP) lesions, biceps tendinopathy, and acromioclavicular (AC) pathology. One hundred twenty four patients were identified. Patients were excluded if they had less than 1 year follow up. Therefore, 100 patients were available with the return to shooting data, clinical outcome scores, and at least 1 year clinical follow up.

Shoulder arthroscopy, biceps tenodesis with or without distal clavicle resection, and rotator cuff repair: indications, operative technique, and rehabilitation

Patients were indicated for shoulder arthroscopy, open subpectoral biceps tenodesis, with or without distal clavicle resection if they had history, physical examination, and advanced imaging findings consistent with a symptomatic SLAP tear, rotator interval pulley lesion, or biceps tenosynovitis. Patients with both anterior Zone 2 biceps groove tenderness to palpation and a positive Speed's examination that replicated their anterior shoulder pain underwent a preoperative ultrasound guided biceps groove diagnostic injection of a combined mixture of local anesthetic and steroid. For these biceps tenosynovitis patients, they were indicated for surgery if they sustained 75%–100% pain relief from the injection. Furthermore, for patients with symptomatic AC joint pathology, patients were indicated for surgery following significant improvement in a fluoroscopic guided AC joint diagnostic and therapeutic injection. Young active duty patients with rotator cuff tears were indicated for surgery after failure of at least 6 weeks of nonoperative treatment with dedicated physical therapy, and had history, physical examination, and imaging findings concordant with a symptomatic rotator cuff tear.

All biceps tenodesis, AC joint and rotator cuff repair procedures were performed in the beach chair position first with a diagnostic shoulder arthroscopy and biceps tenotomy, followed by an open subpectoral biceps tenodesis with a unicortical biocomposite double loaded suture anchor as previously described.¹³ All distal

clavicle resections were done through an open superior approach with 8 mm of distal clavicle resection. Rotator cuff repairs were performed arthroscopically with suture anchors. Postoperatively, all biceps tenodesis patients underwent a standard institutional rehabilitation protocol with passive range of motion starting at 2 weeks, active range of motion at 6 weeks, and strengthening starting at 8 weeks. Heavy lifting or resisted supination was prohibited until 8 weeks postoperative. For patients who underwent arthroscopic rotator cuff repair, rehabilitation was generally 4 to 6 weeks in a shoulder immobilizer in abduction (this was based on the intraoperative size and morphology of the tear). Then passive range of motion began at 4 to 6 weeks, active range of motion at 8 weeks, and rotator cuff strengthening at 12 weeks.

Arthroscopic shoulder stabilization: indications, operative technique, and rehabilitation

For unidirectional anterior and posterior shoulder instability cases, patients were indicated for arthroscopic anterior and posterior shoulder stabilization if they had history, physical examination, and imaging findings consistent with recurrent unidirectional anterior or posterior shoulder instability. Additionally, indications for arthroscopic Bankart repair were patients with no prior surgery with less than 13.5% anterior inferior glenoid bone loss and on track Hill–Sachs lesions. All arthroscopic stabilization procedures were performed in the lateral decubitus position with a minimum of 3 knotless suture anchors. A mean of 4.3 knotless suture anchors were utilized for arthroscopic Bankart repair and a mean of 3.9 knotless suture anchors for arthroscopic posterior labral repair (Fig. 1). Postoperative rehabilitation consisted of shoulder immobilizer wear for 6 weeks with no active use of the arm and early initiation of passive range of motion. The therapy regimen for arthroscopic posterior stabilization differed from arthroscopic Bankart repair in that it emphasized protecting the posterior capsule with restrictions in internal rotation until 3 months postoperatively, whereas arthroscopic Bankart repair patients had no restrictions in internal rotation at 6 weeks.

Open shoulder stabilization: indications, operative technique, and rehabilitation

Patients were indicated for the open Latarjet procedure if they had “critical” (greater than 20 percent) glenoid bone loss, greater than 13.5% glenoid bone loss with an offtrack Hill–Sachs lesion, and had history of a failed arthroscopic Bankart repair with bipolar bone loss. All Latarjet procedures were performed in the beach chair position through an open approach, subscapularis split, and two solid fully threaded 3.5 mm bicortical screws. Postoperatively, Latarjet patients started pendulum exercises immediately, passive range of motion at 2 weeks postoperatively, active range of motion at 4 weeks, and strengthening at 8 weeks. All arthroscopic and open shoulder surgery patients were allowed to return to shooting a rifle at 4.5 months per the standard institutional rehabilitation protocol.

Data collected

Demographic data were collected for all patients, including the laterality of surgery, patient hand dominance, and shooting dominance (Table 1). Shooting dominance was defined as the side the patient places the rifle on while firing. For example, a left shooting dominant patient placed the buttstock in the left anterior shoulder and pulled the trigger with the left index finger. Patient reported outcomes collected included the Subjective Shoulder Value (SSV), American Shoulder and Elbow Surgeons (ASES) score, visual analog scale (VAS) score for pain, and the Western Ontario Shoulder



Figure 1 Arthroscopic photo status post right arthroscopic posterior capsulolabral repair with 4 knotless suture anchors. Patient is positioned in the lateral decubitus position. (★ posterior labrum, ★ glenoid, HH humeral head).

Instability (WOSI) index at the preoperative visit and short term postoperative visits. At the 4.5 month, 6 month, 1 year, and 2 year clinic visits, patients were asked if they could shoot a military rifle and patient reported outcome measures were collected. The current military rifle in use is the M4 carbine which is a 5.56 mm, gas operated, magazine fed, carbine assault rifle (Fig. 2). The civilian equivalent rifle is the AR 15. Although officers in the military (as opposed to enlisted soldiers) are typically assigned a pistol for shooting, the 2 officers in our cohort were “dual carry,” and had to qualify also on an M4 rifle.

Statistical analysis

Descriptive statistics were determined for the study cohort's variables. Univariate analysis was performed for all variables. The Mann Whitney nonparametric test for unpaired samples was used for continuous variables, and the 2 tailed Fisher exact test was used for categorical data. Multivariate logistic regression was utilized to determine independent variables significantly associated with the ability to return to shooting at 6 months postoperatively. The statistical significance was set to a *P* value of .05. All statistics were performed using online software (<https://www.easymedstat.com>).

Results

One hundred patients were included in the final analysis. The mean age was 30.8, range (18–45), with a predominantly male cohort. Ninety percent of the cohort was right hand dominant, and 84% reported right side shooting dominance, with 16% left shooting dominant (Table I). Median baseline preoperative patient reported outcomes were as follows: SSV 50, VAS 7, ASES 42, and WOSI 1419. Significant improvement in SSV, VAS, ASES, and WOSI was shown at 1 year postoperative, SSV 85, VAS 2, ASES 85, WOSI 239, *P* .001 (Table II). The percentage of patients reporting the ability to shoot a military rifle after surgery was the following: 47%, 63%, 85%, and 94% at 4.5 months, 6 months, 1 year, and 2 years, respectively. At 4.5 months postoperatively, patients who underwent shoulder surgery ipsilateral to their shooting dominance (*n* = 59) had a rate of return to shooting (33%) vs. shoulder surgery on the contralateral side of shooting dominance (*n* = 41) (60%), *P* .04.

Table 1
Demographics.

	Shoulder surgery ipsilateral to shooting dominance (N = 59)	Shoulder surgery contralateral to shooting dominance (N = 41)	<i>P</i> value
Mean age, years (SD)	30 (7.9)	31 (8.4)	.33
Sex (male:female)	58:1	39:2	.61
Laterality of surgery (R:L)	48:11	5:36	.001
Hand dominance (R:L)	53:6	37:4	.99
Shooting dominance (R:L)	48:11	36:5	.41
Diagnosis (%)			
Anterior shoulder instability	23 (39)	16 (39)	.81
Posterior shoulder instability	10 (17)	8 (20)	
SLAP tear	9 (15)	3 (7)	
Biceps tendinopathy	14 (24)	10 (24.5)	
AC joint arthritis	2 (3)	3 (7)	
Rotator cuff tear	1 (2)	1 (2.5)	
Surgery performed (%)			
Arthroscopic Bankart repair	12 (20)	11 (27)	.46
Arthroscopic posterior labral repair	10 (17)	8 (20)	
Open Latarjet	11 (19)	5 (12)	
Biceps tenodesis	16 (27)	9 (22)	
Biceps tenodesis + DCR	6 (10)	4 (9.5)	
Open DCR	1 (2)	3 (7)	
Arthroscopic RCR + BT	3 (5)	1 (2.5)	
Open: arthroscopic	38:21	23:18	.65
Posterior instability diagnosis (Yes:No)	10:49	8:33	.99
Mean follow-up (mo), (range)	24 (12–32)	24 (12–33)	.99

SD, standard deviation; R, right; L, left; SLAP, superior labrum anterior to posterior; AC, acromioclavicular; DCR, distal clavicle resection; BT, biceps tenodesis; RCR, rotator cuff repair.

Bold indicates statistical significance value (*P* < .05).

However, there was no significant difference in the groups at 6 months and 1 year (Fig. 3).

Subgroup analyses

In subgroup analyses, there was no difference in rate and time to return to shooting in patients who underwent arthroscopic (*n* = 39) vs. open shoulder surgery (*n* = 61). Furthermore, there was no significant difference in the rate and time to resuming shooting a rifle at any time point between patients undergoing surgery for a diagnosis of shoulder instability (*n* = 57) vs. non instability diagnoses (*n* = 43) (Table III).

Arthroscopic posterior shoulder stabilization: subgroup analysis

However, when we analyzed patients who underwent arthroscopic posterior shoulder stabilization (*n* = 18) vs. the remainder of the cohort (*n* = 82), there was a statistically significant difference in the rate and time to return to shooting at 6 months postoperatively, posterior instability (33%) vs. (69%), *P* .016. At 1 year postoperatively, there was no significant difference between the groups (87%) vs. (84%), *P* .99. At 6 months postoperatively, patients who underwent arthroscopic posterior labral repair ipsilateral to their shooting dominance (*n* = 10) had a rate of return to shooting (22%) vs. posterior labral repair on the contralateral side of shooting dominance (*n* = 8) (57%), *P* .30. In addition, there was a statistically significant difference in the rate and time to return to shooting at 6 months postoperatively between patients undergoing shoulder surgery for posterior instability (33%) versus anterior instability (70%), *P* .03.

In multivariate logistic regression analysis, a diagnosis of posterior shoulder instability was independently significantly associated with the inability to return to shooting a rifle at 6 months postoperatively, *P* .01.



Figure 2 Picture of a right shooting dominant active duty soldier firing the M4 rifle. The buttstock is held against the right anterior shoulder. The left arm supports the forestock of the rifle.

Table II

Clinical outcomes.

	Preop	6 weeks postop	3 mo postop	4.5 mo postop	6 mo postop	1 y postop	2 y postop
Median SSV	50	60	70	75	80	85	80
Median VAS	7	3	2	3	2	2	2
Median ASES	42	53	72	73	82	85	80
Median WOSI	1419	1213	724	678	305	239	350

SSV, Subjective Shoulder Value; VAS, visual analog scale score for pain; ASES, American Shoulder Elbow Surgeons score; WOSI, Western Ontario Shoulder Instability Index.

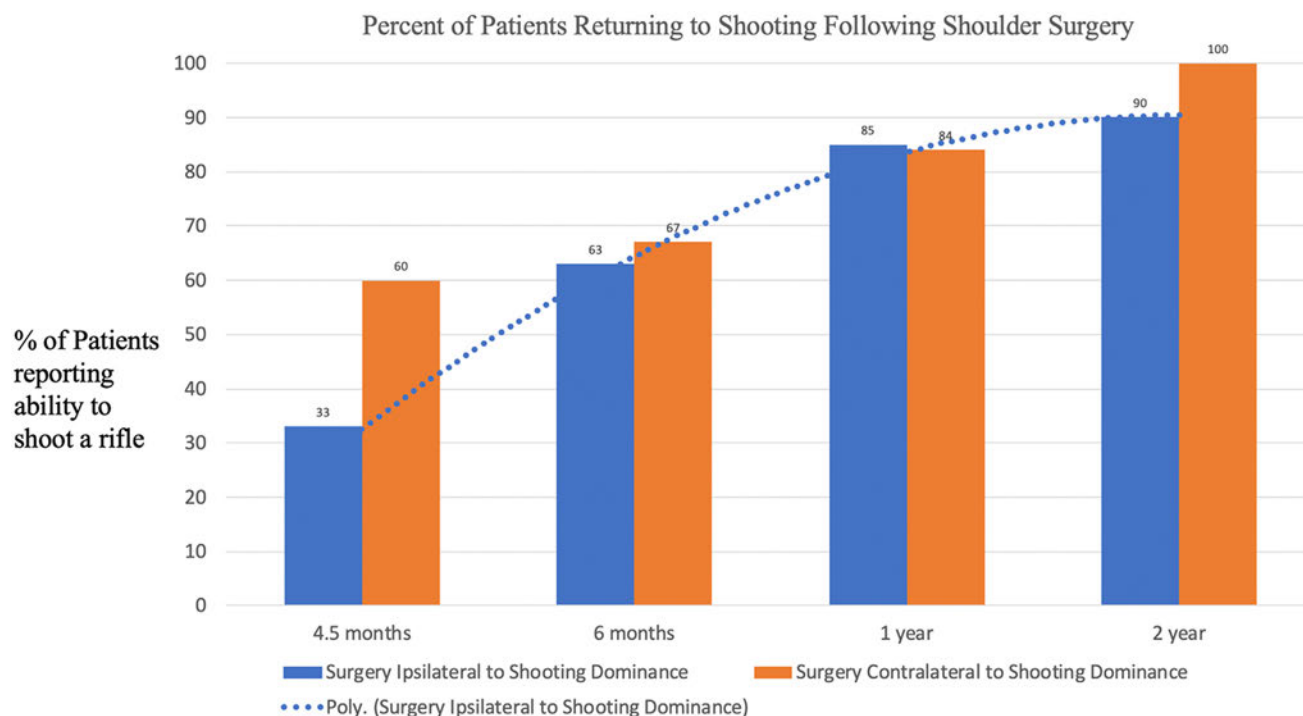


Figure 3 This bar graph depicts the speed of recovery and rate and time to resuming shooting a rifle following arthroscopic and open shoulder surgery. Patients who underwent shoulder surgery ipsilateral to their shooting dominance are represented by the blue bars, and those that underwent shoulder surgery contralateral to their shooting dominance by the orange bars.

Table III

Return to shooting: instability surgery versus non-instability surgery.

	Instability surgery (N = 57)	Non-instability surgery (N = 43)	P value
Mean age, y (SD)	26 (5)	36 (7)	.001
Sex (male:female)	56:1	41:2	.59
Hand dominance (R:L)	53:4	37:6	.50
Shooting dominance (R:L)	52:5	32:11	.06
4.5 mo able to shoot rifle (%)	49	44	.92
6 mo able to shoot rifle (%)	56	70	.29
1 y able to shoot rifle (%)	92	77	.08
2 y able to shoot rifle (%)	92	95	.29

SD, standard deviation; R, right; L, left.

Bold indicates statistical significance value ($P < .05$)

Complications/reoperations

There were 4 complications (4/95) 4.2%. Four patients who underwent open Latarjet had transient sensory neuropraxias (3 axillary and 1 musculocutaneous) which all completely resolved by 4 weeks postoperatively. Two of the axillary nerve sensory neuropraxias were identified in the postoperative recovery room and resolved by the 2 week postoperative visit. This was a 4/16 (25%) rate of transient sensory neuropraxia. There were no permanent nerve injuries. Three of the 4 Latarjet procedures with temporary sensory neuropraxias returned to shooting at 4.5 months, and the other patient reported returning at 6 months postoperatively. Two patients who underwent arthroscopic Bankart repair reported reinjuries with recurrent traumatic subluxation events (2/23) (8.7%), and declined to undergo further surgery. The first of these patients reported not being able to return to shooting at 6 months postoperatively, and the second patient reported the ability to return to shooting at 4.5 months postoperatively and then sustained the reinjury 1 year after surgery. One patient who underwent open Latarjet for greater than 20% glenoid bone loss had coracoid graft lysis without recurrent instability. He later sustained a traumatic rotator cuff tear after a motor vehicle collision and underwent an arthroscopic rotator cuff repair.

Discussion

The primary findings of this study are that there is a high rate of return to shooting a rifle following arthroscopic and open shoulder surgery in young patients. Based on our cohort of 100 patients, 63% reported the ability to shoot their rifle at 6 months and 85% at 1 year postoperatively. Patients who underwent shoulder surgery ipsilateral to their shooting dominance returned to shooting significantly slower than those with surgery contralateral to their shooting dominance. However, there was no significant difference in the groups at 6 months and 1 year. Interestingly, when we analyzed the group of patients who underwent arthroscopic posterior shoulder stabilization versus the remainder of the cohort, there was a significant difference in the rate and time to return to shooting at 6 months postoperatively, with posterior instability patients having a lower rate, posterior instability (33%) vs. (69%). At 1 year postoperatively, there was no significant difference between the groups. Additionally, at 6 months postoperatively, patients who underwent arthroscopic posterior labral repair ipsilateral to their shooting dominance had a rate of return to shooting (22%) vs. posterior labral repair on the contralateral side of shooting dominance (57%). Therefore, this study identified two important findings. First, patients undergoing surgery ipsilateral to their shooting dominance return at a slower rate. Second, patients undergoing

arthroscopic posterior shoulder stabilization return to shooting at a slower rate.

There is limited evidence on return to shooting a rifle following arthroscopic or open shoulder surgery. However, there are a number of studies reporting on return to sport (RTS) and return to duty (RTD). Prior studies have reported that the return to sport and return to duty following biceps tenodesis and treatment of shoulder instability is approximately 4 to 5 months.^{1-3,6,7,10,12,14} Provencher et al reported on 101 patients who underwent open subpectoral biceps tenodesis and found that 82% of patients returned to duty at a mean of 4.1 months.¹² Cassidy et al performed a systematic review and found that military patients returned to duty at 5.4 months following biceps tenodesis.³ Abdul Rassoul et al and Hurley et al performed systematic reviews to determine the mean time to return to play following arthroscopic Bankart repair and open Latarjet, respectively.^{2,10} The mean time to RTS was 5.9 months for arthroscopic Bankart repair and 5.8 months for open Latarjet. Cruz et al evaluated the rate and time to return to duty following open Latarjet in patients with glenoid bone loss, and found 89% were able to return to full unrestricted duty at a mean of 5.3 months.⁶ The difficulty in using 'return to duty' as an outcome measure is that it is too broad, and RTD varies based on a number of variables including rank (junior vs. senior enlisted), military occupational specialty, the unit's training cycle, and other psychosocial factors. Additionally, many military studies utilize profiling data to retrospectively determine RTD. This data is limited in its fidelity secondary to a number of variables inherent to the military profiling system. In this study, we attempted to take a more granular approach by asking patients specifically if they could shoot their military rifle at each postoperative time point, and then we retrospectively reviewed this prospectively collected data. We included 4.5 months as a follow up time point as patients undergo a significant amount of progression in their activities, range of motion, and strength in between the typical 3 and 6 month follow up clinic visits.

Interestingly and as one might expect, patients who underwent surgery ipsilateral to their shooting dominance (ie, right shooting dominance with right shoulder surgery or left shooting dominance with left shoulder surgery) returned to shooting significantly slower than those with contralateral surgery to their shooting dominance. Furthermore, posterior shoulder stabilization patients returned to shooting at a significantly slower rate, especially if they had surgery ipsilateral to their shooting dominance. However, at 1 year postoperatively there was no significant difference between any of the groups. The reasons that arthroscopic posterior stabilization patients returned to shooting at a slower rate is unclear; however, based on our data we hypothesize that it is likely related to the following points. First, the anterior to posterior directed force of the rifle's recoil places stress on the repaired posterior capsulolabral repair and this leads to patients having apprehension about returning to shooting. Second, the rehabilitation protocol for arthroscopic posterior labral repair is slower than the protocol for anterior shoulder stabilization and for shoulder arthroscopy and OBT plus or minus DCR. Our rehabilitation protocol restricts internal rotation in posterior labral repair patients until 3 months postoperatively. This may account for the slower return to shooting.

Interestingly, in this cohort, we also prospectively collected the ability to return to shooting at 3 months postoperatively. We found that 37% of patients reported the ability to shoot their rifle at 3 months including one patient following open Latarjet for critical glenoid loss and a history of over 50 dislocation events and dislocating in his sleep (Fig. 4). Of the patients who reported the ability to shoot a rifle at 3 months postoperatively, none of them had a postoperative complication or were a clinical failure of surgery based on their postoperative clinical outcome scores. Although



Figure 4 Anteroposterior (AP) and axillary lateral views of a young male patient who was an active duty infantryman status post open Latarjet procedure. At 3 months post-operatively, the patient reported the ability to shoot his military rifle.

Table IV

Recoil of commonly utilized shoulder-fired rifles.

Cartridge	Free recoil energy (ft-lbs)	Recoil velocity (ft/sec)	Average muzzle velocity (ft/sec)
.223 / 5.56	5.48	6.65	3122
.270 Winchester	17.64	11.64	2944
.308 Winchester	18.27	11.62	2491
.30-06 Springfield	21.34	12.55	2646
.338 Win Mag	29.90	13.75	2705
.378 Weatherby Mag	60.68	19.38	3040

Ft, foot; lbs, pounds; sec, second.

physical therapists and surgeons would not allow patients to go to a range to actually shoot a rifle that soon after surgery, these data are interesting and provides insight into the speed of recovery in select patients. Further investigation is needed.

Although this study helps delineate the return to shooting with the M4 rifle, which is equivalent to a .223 caliber rifle, it remains unclear how well this correlates to other shoulder fire weapons. In regards to rifle recoil, the M4 is relatively light in both force and velocity compared to many other shoulder fired weapons used for hunting and recreation. It has been shown that approximately 70% of the rifle's recoil is transmitted through the shoulder, with the remaining force distributed through the grip, cheek, and forestock.⁴ The elements of recoil consist of both the force which it produces (measured in foot pounds) and the velocity (measured in feet per second). Therefore, recoil is a function of weapon weight, powder load, bullet weight, and cartridge design. When compared to many hunting rifles, the M4 often produces 3 to 4 times less recoil energy and typically about half of the recoil velocity (Table IV).^{8,9} Although we could presume that larger recoil would translate to increased pain and potentially a slower return to shooting, this would require further studies to confirm this.

Furthermore, in addition to recoil, the other key variable required for successful return to shooting is the ability to generate adequate rifle stability. This has been studied in the biathlon shooting population.¹¹ Rifle stability is achieved through compression of the buttstock against the shoulder while supporting the stock of the rifle with the contralateral arm through isometric elbow flexor contraction and shoulder forward elevation. Therefore, the dynamic task of rifle shooting involves a coordinated effort of the operative and nonoperative shoulder following shoulder surgery.

Limitations of the study include its retrospective design. In addition, the study was limited by the inherent weaknesses in self reporting return to duty.¹⁵ We acknowledge that asking patients whether they can shoot a rifle is distinctly different than the patient

actually shooting a rifle on a range. However, it would be challenging to objectively assess this task after shoulder surgery in all patients given that rifle ranges are conducted by units during certain training cycles and times during the year. Use of a simulator may be a future area of potential study to assess ability to return to shooting. Lastly, this cohort was composed of active duty military assigned the M4 carbine rifle and may not be generalizable to a civilian population firing other higher caliber rifles. However, we feel these data can be extrapolated to the civilian population as patients commonly recreationally or competitively shoot the AR 15 which is the equivalent rifle to the M4 carbine.

Strengths of the study include the detailed collection of both preoperative and postoperative legacy patient reported outcome measures at multiple time points to develop an accurate speed and trajectory of recovery. Additionally, the collection of the ability to return to shooting a rifle starting at multiple postoperative appointments provides valuable data on the speed of recovery.

Conclusion

Patients undergoing arthroscopic and open shoulder surgery have a high rate of return to shooting. Approximately 60% of patients resume shooting at 6 months postoperatively and 85% return at 1 year. Patients undergoing shoulder surgery on the contralateral side of their shooting dominance return to shooting significantly faster than those with shoulder surgery ipsilateral to their shooting dominance. Additionally, those undergoing arthroscopic posterior shoulder stabilization return to shooting at a slower rate than anterior stabilization surgery.

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EXHIBIT 60

The .223 Family Tree

 gundigest.com/gear-ammo/ammunition/the-223-family-tree

Richard A. Mann

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5



As the original cartridge of the AR-15, the .223 Remington, is now the father of several other cartridges that can do things the .223 cannot—while still being AR-15 compatible.

The .223 Remington cartridge and its AR-compatible offspring.

The M16/AR15 was originally chambered for the .223 Remington (1962), and since then that cartridge has become the patriarch of several very useful cartridges that are also AR-15 compatible.

Metallic rifle cartridges come in families. In the .30-06 family, you have the .270 Winchester and .280 Remington. In the .308 Winchester family, you have the .243 Winchester and 7mm-08 Remington. Though the .223 Remington now has its own family, it was based on the .222 Remington (1950), which was a proprietary cartridge, meaning it wasn't based on another SAAMI-approved cartridge.



As the original cartridge of the AR-15, the .223 Remington, is now the father of several other cartridges that can do things the .223 cannot—while still being AR-15 compatible.

If you want an AR-15 that's multi-cartridge compatible, it makes sense to choose cartridges from the same family. This will allow a conversion with nothing but a barrel or barreled upper receiver. Since the cartridges all come from the same family, you won't need to replace the bolt carrier or bolt, because the rim diameter for all the cartridges is the same.

With an AR-15 chambered for the .223 Remington, you can do this and run five other cartridges. Here's a look at the .223 Remington, and the family of AR-15-compatible cartridges it has fathered.



For those who might like to have multiple uppers for the same AR-15 lower, Wilson Combat now offers a 30-round magazine that's compatible with the .223 Remington, the .300 Blackout and the .300 HAMR.

.223 Remington (1962)

The development of the .223 Remington is intrinsically linked to the M16, which is the full-auto version of the civilian rifle now known as the AR-15, or in more politically correct circles, as the MSR (modern sporting rifle). The military would ultimately replace the .223 Remington with its twin, the 5.56 NATO, but that didn't have any impact on the cartridge's popularity. Since its introduction, it has become very popular for competition, hunting and self-defense.



The .223 Remington was the original cartridge of the AR-15. Even though it has spawned several excellent offspring, it remains the most popular chambering for the platform.

Though many will argue it doesn't suffice for deer or any type of big-game hunting, it is, in fact, legal for that pursuit in more states than not. And as far as factory ammunition goes, you'll only find more options for the .308 Winchester. Most importantly, the .223 Remington has served as the basis for five other cartridges that have all become viable options in the AR-15.



Next to overall length, rim size is critical when it comes to AR 15 compatibility. With the same 0.378 inch rim diameter, an AR-15 can be easily converted to any of these cartridges.

5.56 NATO (1980)

Maybe the best way to describe the 5.56 NATO, which was created to deliver better reliability and performance for military use in the M16, is to say it's the better-performing identical twin. It's the twin that ultimately became the career soldier of the family. From an external dimension standpoint, the .223 Remington and the 5.56 are identical. The real differences involve maximum average pressure (MAP) and how the chamber is cut into the barrel.



The 5.56 NATO is a dimensional twin to the .223 Remington, but the cartridges aren't 100-percent interchangeable.

Regarding pressure, 5.56 NATO ammunition is loaded to a MAP of about 58,000 psi. The .223 Remington is loaded to a MAP of 55,000 psi. The throat of the chamber for the 5.56 NATO is also cut 0.125-inch longer. Because of these differences, if you fire a 5.56 NATO cartridge in a rifle chambered for the .223 Remington, pressures can spike to as high as 65,000 psi. This isn't safe and can cause primers to back out—or even a catastrophic firearm failure. On the other hand, it's safe to fire .223 Remington ammunition in a rifle chambered for the 5.56 NATO. Reliability and accuracy might not be optimal, but it's safe.

Interestingly, the 5.56 NATO isn't a SAAMI-approved cartridge. However, most of today's AR-15 rifles are chambered for it as opposed to the .223 Remington to allow for maximum ammunition compatibility.



By staying in the family, you can swap upper receivers and shoot different cartridges without having to change out the bolt in your rifle.

.204 Ruger (2004)

Most families have that one member who never seemed to grow up. They're cute, smart and good at their job, but they just never were all that popular. That's the case with the .204 Ruger. Though the .222 Remington Magnum is credited as the parent case for the .204 Ruger, the .222 Remington Magnum is like the older and bigger brother to the .223 Remington. However, like the .222 Remington, the .222 Remington Magnum has, for the most part, fell into obscurity. Though not originally thought of as a cartridge for the AR-15, given it's .223 Remington-sized 0.378 rim diameter and less than 2.26-inch overall length, it'll work well in MSRs.



The .204 Ruger is the fastest AR-15 compatible offspring of the .223 Remington and is ideal for vermin and predator hunting.

With its ability to push a 32-grain bullet faster than 4,000 fps, the .204 Ruger is the fastest-shooting cartridge within the .223 Remington family. With that speed and explosive results on small vermin, it's a favorite for shooting prairie dogs, fox, bobcats and coyotes. Ammunition is available from most of the major manufacturers, but with only about 20 factory loads, bullet choices are limited.

.300 Blackout (2011)

If there's a cool kid in the .223 Remington family, it's the .300 Blackout. The cartridge was developed by Advanced Armament Corporation (AAC) to provide intermediate ballistics like the 7.62×39 Russian cartridge, while also performing very well as a subsonic cartridge. Though AAC, in conjunction with Remington, get credit for the cartridge's development, it actually began life as a wildcat developed by J.D. Jones and was known as the .300 Whisper.



The .300 Blackout is really two cartridges in one. On one hand, it's the best subsonic cartridge for the AR-15, and on the other, it'll suffice for smallish, big-game hunting and limited tactical application.

Jones shortened the .223 Remington case and necked it to fit a .30-caliber bullet. AAC and Remington took Jones' creation, refined the concept and submitted it to SAAMI for approval. The rest is history; next to the .223 Remington/5.56 NATO, the .300 Blackout is the most popular chambering in the AR-15 platform.



If subsonic shooting is what you desire, the .300 Blackout is the best cartridge for the AR-15.

Smart marketing and a cool name get some of the credit for the Blackout's success. The rest of its success is attributed to the availability of factory subsonic and supersonic ammunition. Shooters could go quiet with subsonic ammo and a suppressor, or tackle deer and feral hogs with supersonic loads. Though early subsonic blackout loads delivered dismal terminal performance, today there are several expanding subsonic offerings. However, it's rare an AR-15 will shoot both subsonic and supersonic loads with great precision. There have also been instances where a .300 Blackout cartridge was chambered in a .223 Remington. This generally results in the permanent disassembly of the rifle and sometimes an injured shooter.



For AR 15 compatibility, cartridge overall length is critical and must be around 2.26 inches or less to work in magazines.

.300 HAMR (2020)

Some families have that kid who just happens to be good at everything he tries. He's good at basketball, soccer and track. He's smart, good looking and seems to get all the girls. In the .223 Remington family, that distinction goes to the .300 HAMR.

Designed by Bill Wilson of Wilson Combat, the .300 HAMR is a shortened .223 Remington case that's been necked up to .30 caliber. The cartridge was SAAMI approved in 2020 and will work with bullets weighing between 95 and 150 grains. Essentially, it duplicates or better the external and terminal ballistics of the .30-30 Winchester and for big-game hunting, outclasses all its siblings.



Mostly thought of as a hunting cartridge, the .300 HAMR has broad application and maybe the best general-purpose cartridge for the AR-15.

Like that athletic kid who does well in all sports but is mostly remembered just for one, the .300 HAMR has the same problem. Initially promoted by Wilson Combat as the ideal big-game cartridge for the AR-15, that's the task the cartridge is most often associated with. However, with the wide range of projectiles available—Wilson Combat currently offers 14 loads—including everything from bonded to mono-metal bullets, the .300 HAMR also performs admirably in a tactical setting. Wilson Combat now also has a multi-caliber 30-round magazine that'll work with the .300 HAMR, .300 Blackout and the .223 Remington.

.350 Legend (2019)

The .350 Legend is kind of like that fat uncle who still drives a Chevy Nova, smokes cigars, tells good jokes and drinks all the beer in the fridge every time he comes to visit. It's a bit of an oddity when it comes to cartridges. Most cartridges are created to deliver a level of external or terminal ballistics unobtainable with the parent cartridge or any other cartridge in the family. While the .350 Legend sort of does that, the prime motivation behind its development was to comply with straight-wall deer hunting cartridge legality in some Midwestern states.



The .350 Legend is unique in that while a descendant of the .223 Remington, it was created to meet hunting regulations in just a few states.

Using the .223 Remington cartridge case, Winchester got rid of the shoulder and made the .350 Legend case with only minimal taper down to a bullet diameter of 0.357. This lack of a shoulder and the .35-caliber bullets allowed it to meet straight-wall deer hunting cartridge requirements, and feed and function in an AR-15.



Designed for states with straight-wall cartridge restrictions for deer hunting, the .350 Legend has surprisingly found nationwide acceptance.

What might be most surprising about this cartridge is that it has found favor from coast to coast. It offers good big-game hunting performance out past 200 yards with minimal recoil. This makes it a great deer hunting round in an AR-15 or a compact bolt-action rifle for new, young and recoil-sensitive shooters.

.22 Nosler (2017)

The .22 Nosler (2017) is sort of a crossbreed cartridge. Like in many human families, sometimes there's a bit of cheating going that can result in a bastard. The .22 Nosler isn't based on the .223 Remington case. Instead, it's based on the 6.8 SPC (2002) cartridge case, which is actually a descendant of the .30 Remington (1906).



The .22 Nosler isn't based on the .223 Remington case, but it does share the same rim diameter, making it an easy conversion for an AR-15 chambered for the .223 Rem.

But Nosler wanted to make it easy to convert an AR-15 chambered for any cartridge in the .223 Remington family to the .22 Nosler. So, they reduced the rim diameter of the parent 6.8 SPC case from 0.422 inch to 0.378 inch. You could say that the .22 Nosler cartridge case is slightly deformed, because its rim is rebated ... or smaller than the base diameter of the cartridge. From a velocity standpoint, the .22 Nosler approaches the .204 Ruger and outclasses the .223 Remington. The downside is limited availability of factory ammunition.

Editor's Note: This article originally appeared in the June 2021 issue of *Gun Digest the Magazine*.

More On .223 Remington:



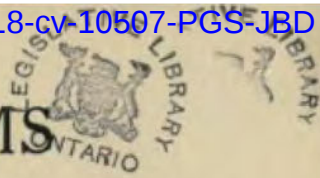
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FIREARMS IN AMERICAN HISTORY

*Naval to
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1600 to 1800

BY
CHARLES WINTHROP SAWYER

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As the Sawyer collection of firearms lacked a number of pieces necessary to illustrate this work, application was made to several other collectors for permission to photograph arms in their collections. To Messers MARK FIELD, CHARLES D. COOK, DR. J. B. THORNTON, W. A. LAWRENCE, J. M. SCRAFFORD, and FRANCIS R. BANGS, grateful acknowledgment is made for their exceeding kindness, courtesy, and generosity.

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as sharpshooters to pick off any British soldiers or officers who were incautious in exposing themselves. This they did to perfection. There is mention of a British soldier shot at 250 yards when only half his head was visible; of ten men, three of whom were officers, killed one day while reconnoitering; of a rifleman who, seeing some British on a scow at a distance of fully half a mile, found a good resting place on a hill and bombarded them until he potted the lot.

And so on, until General Howe, thinking that his statement of casualties and American marksmanship might need proof at home, gave orders for the capture alive of one of the curiosities complete with his shooting-iron, and offered a reward. Finally he got one and sent him to England rifle and all, and the marksman was made to perform there and exhibited as a curiosity. This bit of stage-play had an effect upon the British public that perhaps Howe did not anticipate — and perhaps he did, for he was accused of being lukewarm to the King's policy — that of frightening the British public, through the newspapers, to such an extent that enlistments in the army, difficult to get before, absolutely stopped for a period, and the only new recruits were those forced into service by the German princes of whom King George the Third hired them.